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FEATURES

- 014 TOP 9 OLYMPIC UPSETS: #7 ANTHONY NESTY BEATS THE GREAT ONE!**
by *Chuck Warner*
Beginning with the November 2015 issue and running through July 2016—a month before the start of the Olympic swimming events in Rio on Aug. 6—Swimming World Magazine will bring you its top 9 upsets in the individual events in Olympic history—in particular, in the last 50 years.
- 016 5 TOP STORIES OF 2015**
by *Jason Marsteller*
- 017 THE STATE OF U.S. SWIMMING: THUMBS-UP!**
by *Chuck Warner and Annie Grevers*
New swimming facilities in the United States are keeping pace with the country's growing number of competitive swimmers.
- 020 2015 ATHLETES OF THE YEAR: DIVING, POLO, SYNCHRO, DISABLED SWIMMING**
by *Jason Marsteller*
- 026 HERE COME THE AMERICANS!**
by *Annie Grevers*
Team USA's men's breaststrokes are ready to kick down the door in 2016. With Nic Fink, Cody Miller and Andrew Wilson not having to divide their attention between the books and the pool, and Kevin Cordes training under Zen master and Olympic breaststroker Sergio Lopez, the year is bubbling with possibilities.

030 2015 RECORD PROGRESSION
by *Jason Marsteller*

COACHING

- 010 LESSONS WITH THE LEGENDS: BOB BOWMAN**
by *Michael J. Stott*
- 012 SWIMMING TECHNIQUE MISCONCEPTIONS: ARM ENTRY**
by *Rod Havriluk*
In freestyle and backstroke, swimmers typically complete the arm entry with the arm parallel to the surface. In butterfly, it is common for swimmers to complete the arm entry with the hands above the shoulders. Research shows that these typical arm entries result in significant wasted time.
- 019 TECHNIQUE: BACKSTROKE—REACH FOR THE SKY!**
- 022 THE SWEET SPOT IN DISTANCE TRAINING: WHERE VOLUME MEETS INTENSITY**
by *Michael J. Stott*
Distance training has changed considerably over the years. The key is finding the balance among endurance, speed work and training at critical practice speeds.
- 041 Q&A WITH COACH SUSAN TEETER**
by *Michael J. Stott*
- 042 HOW THEY TRAIN LISA BOYCE AND CLAIRE McILMAIL**
by *Michael J. Stott*

016



TRAINING

040 DRYSIDE TRAINING: NEW YEAR, NEW STRENGTH—4 SIMPLE EXERCISES TO A STRONGER 2016
by *J.R. Rosania*

JUNIOR SWIMMER

036 GOLDMINDS: HOW MUCH IS ENOUGH?
by *Wayne Goldsmith*
The training load for young swimmers and the high time commitment required to be involved in competitive swimming are critically important issues both to the athletes and their parents.

045 UP & COMERS
by *Taylor Brien*

COLUMNS

- 008 A VOICE FOR THE SPORT**
- 046 GUTTER TALK**
- 048 PARTING SHOT**

020

ON THE COVER

At the USA-Europe Duel in the Pool in December, American Cody Miller beat world record holder Daniel Gyurta in the 200 breaststroke (SCM) while trimming 5-hundredths of a second off the American record. The next day, Miller added the U.S. mark in the 100 breast. The Brits may boast a world record holder (Adam Peaty) and a 59-flat 100 breaststroker (Ross Murdoch), while South Africa (Cameron van der Burgh) and Lithuania (Giedrius Titenis) have swimmers who dipped under 59 in 2015. But they all should have formidable American breaststrokes nipping at their heels this Olympic year, including Miller, Nic Fink, Andrew Wilson and Kevin Cordes. **(See story, page 26.)**

[PHOTO BY PETER H. BICK]

046





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THE LIFT OF THE OLYMPIC YEAR

BY CASEY BARRETT

We all live lives measured in fours. Other sports, they'll say, "Wait till next year." In swimming—and in the rest of the Olympic family—it's: "Wait another four."

It's a cycle of life measured across 1,461 days—can't forget the Leap Year day (incidentally also a quadrennial tradition)... Almost 1,500 days—that seems like a long time, but when you're immersed in the relentless march of Olympiads, these four-year windows of light always seem to come upon you fast.

There's something about the start of an Olympic year. All senses are heightened. Everything takes on just a bit more urgency. You're less likely to hit snooze; more likely to stress about an in-season broken-down meet. Coaches may be a bit more on edge than usual...parents a little more anxious about their kids' diet and daily schedule. But despite the anxiety that comes with an approaching Games, there is also the undeniable lift.

No matter where you are in the world, an Olympic year means faster times. You know the breakthroughs are coming from teens on the rise. You know the focus has returned for the old champions—the ones that might have drifted through some years without that Games-fueled passion. And you know that everyone is ready to make his or her mark.

Obviously, this is true at all the A-list club teams and top Division I colleges that are stacked with Olympic Trials qualifiers. But we also see it across the spectrum, in the age group ranks and at schools that might never have had a Trials qualifier. That spirit of Olympic excellence infects everyone in the sport. You'll see more team records and meet records and state records and NAG records—records of every stripe fall with more frequency in these special 4th years. (*An observation I'm sure we've all had; perhaps a study from USA Swimming could analyze that thesis?*)

It's already started, of course. In the waning weeks of 2015, the Speedo Junior National Championships, East and West, flashed some performances from teens that sent tongues wagging. There was 14-year-old Alex Walsh from the Nashville Aquatic Club sending out Ledecky-esque vibes a half year before Trials.

Remember, back in late 2011, when Katie Ledecky started to drop those scary fast times as a 14-year-old? Then she turned 15 in March of the Olympic year and confirmed herself as a bona fide contender. By summer, she was racing away to upset gold in London. That's how fast it can happen for kids that age.

At Juniors East in Atlanta, Alex Walsh destroyed two NAG records—in the 200 yard IM and 100 back. Her hard-to-fathom 51.62 in the backstroke sent a message to the stroke's reigning queens that this up-and-comer will be in the mix, come Omaha.

Meanwhile at Juniors West in Austin, the amazing Michael Andrew continued to annihilate NAG records—in the 200 IM and 100 breast, most recently. However, it was 17-year-old Ryan Hoffer of Scottsdale Aquatic Club who stole the show. His pair of 45-mids in the 100 fly and 100 back was incredible, but his 41.23 in the 100 yard freestyle was downright astonishing. In fact, it broke not only the NAG record, but the pool record as well! And the Lee and Joe Jamail Texas Swim Center has seen just a few rather fast freestylers in its waters over the years!

Regardless of whether or not these teens race their way to Rio this summer, they're feeling the Olympic lift like all of us in this sport. There's just something about an Olympic year. No matter how old or how fast, these are the times we live for. ❖

Casey Barrett
Senior Commentator



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Peter H. Bick, USA Today Sports Images,
Reuters, Getty Images

OFFICIAL MAGAZINE OF:



ENDORSED BY:



PUBLISHER:



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SELECTION PROCESS FOR OFFICIALS AT OLYMPIC TEAM TRIALS

BY JIM HOLCOMB

Several times the last few months, I've been asked, "When can I apply to officiate at the upcoming Olympic Team Trials in Omaha?"

Officials can't actually apply to officiate because the event is by invitation only. However, if you're wondering how to get invited for future OTTs, the best place to start is to answer the question, "How do I get selected to officiate at a national championship event?"

The answer comes from the policies and procedures manual of the national committees: "The officials chair, together with the vice president of program operations, will review and approve the selection of officials for all USA Swimming Championships."

Those specified meets are all those above the level of sectionals (think two stars and above on our meet logos), including futures, juniors, Arena Pro Swim Series, nationals and team selection events such as Olympic Team Trials and World Team Trials.

With the exception of OTT, these meets have an application process. Send in an application—you must be an N3 official in the position you apply to work—and the selection process begins. The vice president and I first select a meet referee, who then helps us in the process to select the remaining officials.

The number of applications varies from meet to meet, but we regularly receive fewer applications than we would like.

To improve your chances of selection and, perhaps, to be chosen for one of the "assigned positions"—for example, deck referee or starter—begin to officiate outside of your LSC.

The ideal starting place is to officiate at a sectionals meet. Multiple sectionals take place in both long course and short course seasons. Also, there are six or seven Arena Pro Swim Series meets each year across the country. Get out there and get yourself known. Do a good job in your position, be a positive team player...and you will get noticed. Getting noticed is the first step to working those meets with "more stars in the logo." As you work more of these "multi-starred" meets, your chances of being selected for the 2020 Olympic Team Trials improve.

The 2016 Olympic Team Trials will take place June 26-July 3, and the selection process for officials was being finalized last month. Invitations were scheduled to be sent by the end of December. ❖

Jim Holcomb is the National Officials Committee chair of USA Swimming.

STEVE LOTTES

Steve Lottes, a swim official for 18 years with Maryland Swimming (MSI), began his officiating career as a chief judge (CJ) at a Grand Prix meet in Long Island, N.Y. He also served at



meets outside the LSC to gain experience on the deck. He has worked as a CJ and team lead at several national meets, including the 2008 and 2012 Olympic Trials. His mentoring program in MSI has led to invitations as a mentor and evaluator at other LSCs. Lottes has trained more than 50 officials in the CJ role. Many other LSCs have also sought after him for mentoring all levels of officials, but especially CJ. Recently, one MSI official was evaluated at another LSC's OQM meet. The official sent Lottes a copy of his evaluation, which stated: "Well trained—a product of the Steve Lottes School of CJ'ing." What a testimony to mentoring local officials!

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COACHES SHARE SOME
OF THE SECRETS OF
THEIR SUCCESS.

BY MICHAEL J. STOTT

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BOB BOWMAN

[PHOTO PROVIDED BY SUN DEVIL ATHLETICS, ASU]



PICTURED > Bob Bowman has built winners at every stop. A senior captain at Florida State University (B.S., developmental psychology; minor, music composition, '87), he later served as a Seminole assistant and coach at Area Tallahassee Aquatic Club. From there, he moved to assistant positions with Napa Valley Swim Team, Cincinnati Pepsi Marlins and Las Vegas Gold (under David Marsh).

He held head coaching jobs with the Birmingham Swim League and Napa Valley (again) before moving to the North Baltimore Aquatic Club in 1996, where—while serving as senior and high performance coach—he produced three individual national champions, 10 national finalists and five U.S. national team members. From 2005 to 2008, Bowman was head coach for the University of Michigan men before returning to NBAC as CEO and head coach.

At NBAC in 1997, he began a partnership with Michael Phelps who has since captured 18 Olympic gold medals (22 in all), seven world and nine American Swimmer of the Year awards and one FINA Swimmer of the Year accolade (2012). For the coach, it has meant six USA Swimming, five ASCA and one USAS Developmental coach of the year honors.

Bowman was a USA assistant Olympic coach in 2004, 2008 and 2012. A 2010 ASCA Hall of Fame inductee, this past summer he was named the USA's men's Olympic coach for 2016 Rio.

What has been the motivation for all those job changes?

To become a better coach and to learn from different people, essentially to find situations where I could grow personally and professionally. I've always had kind of a wanderlust, but most of the time it was to step up my professional growth.

You and Michael Phelps have been together since 1997. How have you both matured and gotten better?

We've been through everything together—the good, the bad and the ugly. At each of those stops, we've tried to say, "OK, what just happened here? What can we learn that will help us in the future?" And that's after eight gold medals in Beijing or not making the 400 IM finals in London or personal areas in which we have had some big public issues. We react to each of these the same way: "How do you handle it?"

I am proud of Michael right now because he has renewed enthusiasm for swimming. He's never been better physically in terms of his strength and general health. His training in the water is quite good. He loves the sport, is swimming for the right reasons and thinks there are some things he can still accomplish.

Look at his performances from last summer. Clearly, he is swimming at near his top level in his best events.

How has international swimming changed in the last 15 years, and how have you changed with it?

The competition has gotten much better—in the U.S. and around the world. The world has caught up with us in terms of performance levels. As long as we are pushing each other, we'll move the sport forward. People are using more science and using it more effectively, especially on a practical rather than just theoretical basis. And there is a lot more information and sharing of it thanks to the Internet. Overall, the world has just gotten better at making people faster.

Thanks to chemical enhancements?

I think we are more aware of some things that may have been going on for a while. The access to a lot of information also means access to information that maybe shouldn't be used in the sport as well. I am hoping that the people who test for drugs along with USADA and WADA will use technology and the best minds to help make our sport—all sport—cleaner.

Do you have a life outside of swimming?

I have a lot of horses. Michael and I have two together (Water Cube and By a Hundredth). They are trained by Graham Motion, who won the Kentucky Derby with Animal Kingdom as well as the Dubai Cup. I'm also a partner in breeding some horses.

How do you want to be remembered?

I'll be remembered as "Michael Phelps' coach"—good, bad or indifferently. That will be on my tombstone or in my obituary.

When will you give up this swimming thing?

Probably never. Most likely, I'll just keel over on the pool deck. I don't know that I can retire. Time off after 2012 taught me I am a terrible vacationer. I like to work, so I am going to work as long as I can. I plan to be in swimming for the duration. ❖

Michael J. Stott is an ASCA Level 5 coach whose Collegiate School (Richmond, Va.) teams have won eight state high school championships.



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SWIMMING TECHNIQUE MISCONCEPTIONS:

ARM ENTRY

BY ROD HAVRILUK

Many people believe that it is worth copying the technique of the fastest swimmers. In reality, even the fastest swimmers have technique limitations, but they offset them with strength and conditioning. The purpose of this series of articles is to address scientifically the technique misconceptions that have become “conventional wisdom,” and to present options that are more effective.

In freestyle and backstroke, a common technique misconception is that it is effective for a swimmer to complete the arm entry parallel to the surface. In butterfly, it is common for a swimmer to complete the arm entry with the hands above the shoulders. A related misconception is that a downward angle on the arm entry generates more resistance. However, a downward arm entry angle quickly positions the arm to begin the pull and generate propulsion. In addition, a downward arm entry angle generates less resistance than a typical arm entry.

TYPICAL ARM ENTRY

Fig. 1 shows the position of the arm at the completion of the entry for three of the world’s fastest swimmers. The freestyler (Nathan Adrian) and the backstroker (Ryan Lochte) both completed their arm entry with their arm parallel to the surface. The butterflyer (Michael Phelps) completed his arm entry with his hands above his shoulders.

Research clearly shows that swimmers limit themselves with these types of arm entries. One study of 40 university freestylers found that the males typically completed the arm entry parallel to the surface in a position similar to Adrian in **Fig. 1A** (Becker & Havriluk, 2014).

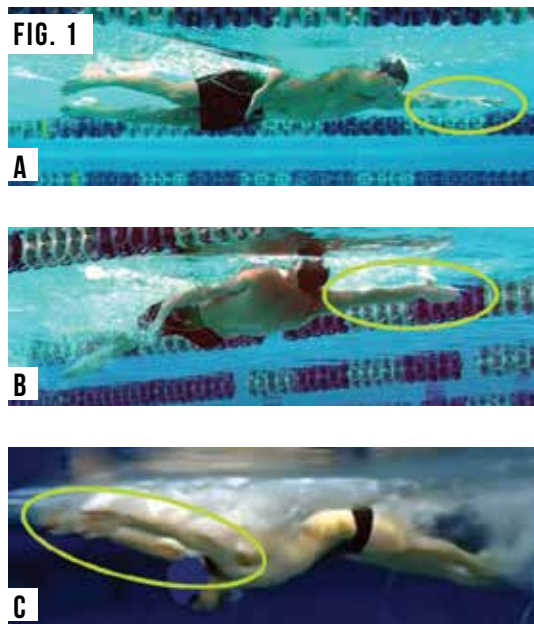


FIG. 1 > (ABOVE) These photos show the typical arm entry for freestyle (Fig. 1A by Nathan Adrian), backstroke (Fig. 1B by Ryan Lochte) and butterfly (Fig. 1C by Michael Phelps).

As a result, they wasted 11-hundredths of a second before their hands submerged below their shoulders and were in position to generate propulsion. Females wasted even more time. The freestylers typically completed the arm entry with the hand above the shoulder and wasted 28-hundredths of a second before they were in a position to generate propulsion.

A study of 23 female butterflyers had a similar finding. They completed the arm entry with the hands above the shoulders (in a position similar to Phelps in **Fig. 1C**) and wasted 35-hundredths of a second before their arms were in position to generate propulsion (Becker & Havriluk, 2010).

Fig. 2 (next page, top left) is a graph of the wasted (non-propulsive) and propulsive times from the two studies. The graph shows a substantial percentage of wasted time for male freestylers (14 percent) and an even greater percentage for female freestylers (31 percent) and butterflyers (43 percent).

IMPROVED ARM ENTRY

Although swimmers waste a considerable amount of time on the typical arm entry, there is a remedy. To improve the arm entry in freestyle and butterfly, a swimmer must maintain a downward angle of the arm as it straightens. In backstroke, the hand must continue to submerge until it is below the elbow, and the elbow is below the shoulder.

At the completion of an effective arm entry for each stroke (see **Fig. 3 next page, bottom left**), the hand is the deepest part of the arm. There are a number of benefits to this improved arm position:

- Better leverage because of a stronger

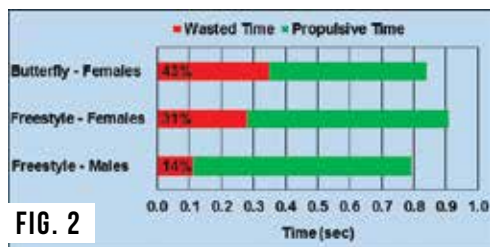


FIG. 2

angle at the shoulder;

- Immediate propulsion as the hand begins to face backward more quickly;
- Less shoulder stress because the upper arm does not impinge on tendons;
- Faster stroke rate due to elimination of wasted time.

Coaches frequently ask if the downward arm entry angle generates resistance. If the arm positions in **Fig. 3** were held motionless, they would, indeed, cause resistance. However, once the arm entry is complete, elbow flexion immediately begins the pull to generate propulsion and avoid resistance. **Fig. 4** shows how the typical parallel arm entry produces resistance as water flows against the back of the arm (blue arrows) as it submerges to a position where it can generate propulsion (from 1 to 2).

FIG. 3

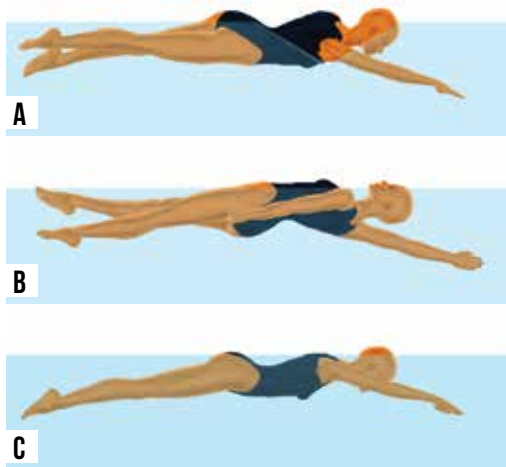


FIG. 2 > (ABOVE) These illustrations show improved arm entry for freestyle (Fig. 3A), backstroke (Fig. 3B) and butterfly (Fig. 3C).



FIG. 4



FIG. 5



FIG. 2 > (ABOVE, LEFT) This graph shows the wasted (non-propulsive) and propulsive times that the hand is in the water.

FIG. 4 > (TOP) When the arm moves downward from a position parallel to the surface (from 1 to 2), water flows against the back of the arm, causing resistance (blue arrows).

FIG. 5 > (ABOVE) Recovering the arm with the elbow above the hand facilitates a downward arm entry angle on both freestyle (top) and butterfly (bottom).

STRATEGIES TO FACILITATE AN IMPROVED ARM ENTRY

An effective arm entry is both unconventional and unnatural. Consequently, specific strategies are necessary to improve this critical aspect of technique. For either the freestyle or the butterfly recovery, a swimmer must elevate the elbow above the hand. If the elbow is the highest part of the arm on the recovery, it will be easier to enter with a downward angle (see **Fig. 5**). In addition, the hand must enter close enough to the shoulder so that the arm straightens as it submerges.

In backstroke, the arm is usually straight as it enters. The hand must continue to submerge until it is below the elbow, and the elbow is below the shoulder. Two important strategies facilitate an effective entry in backstroke:

- Submerge the hand simultaneously with the downward torso rotation;
- Submerge the hand by using the full range of motion at the shoulder. ❖

Dr. Rod Havriluk is a sports scientist and consultant who specializes in swimming technique instruction and analysis.

His unique strategies provide rapid improvement while avoiding injury. Learn more at the STR website—www.swimmingtechnology.com—or contact Rod through info@swimmingtechnology.com.

SUMMARY

In freestyle and backstroke, swimmers typically complete the arm entry with the arm parallel to the surface. In butterfly, it is common for swimmers to complete the arm entry with the hands above the shoulders. Research shows that these typical arm entries result in significant wasted time.

For an effective arm entry in freestyle and butterfly, the hand angles downward as the arm straightens. In backstroke, the hand submerges until it is deeper than the elbow, and the elbow is deeper than the shoulder. This ensures the arm is in position to generate propulsion immediately.



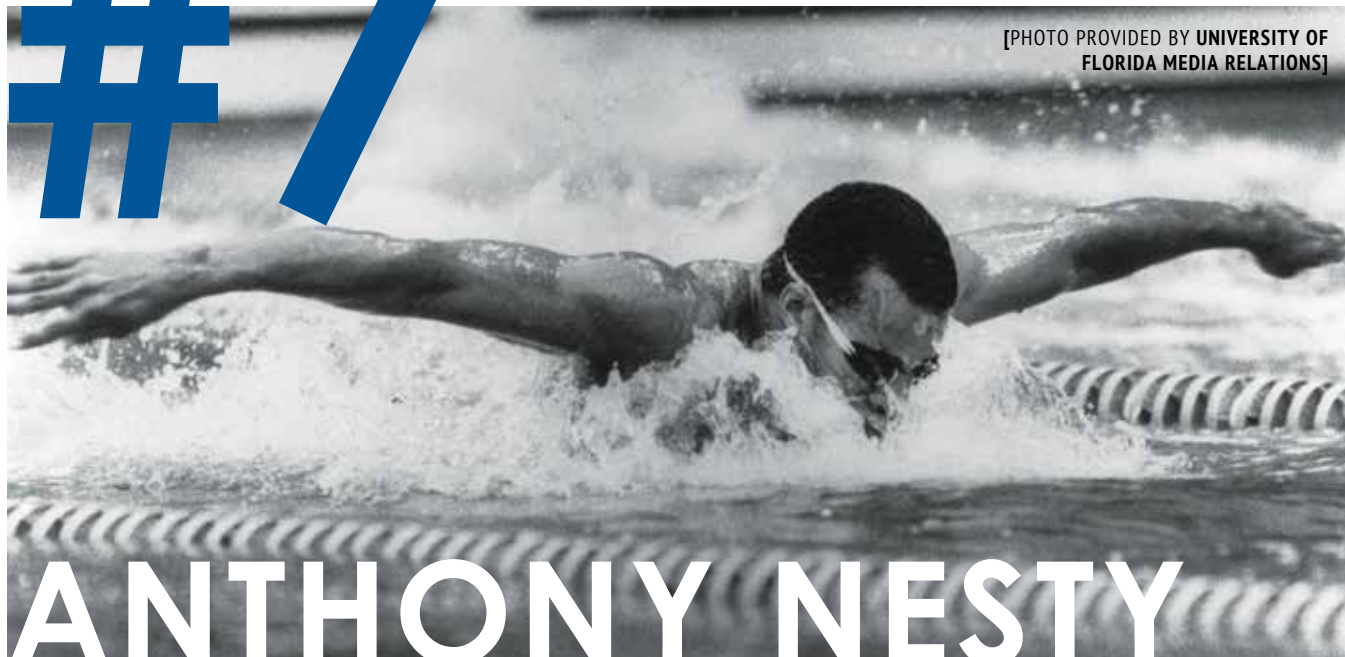
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Who will shock the world of swimming in Rio? Is it someone we can anticipate if we take a deeper look into the backstory of past upsets? The understanding and appreciation of an Olympic upset can enhance our enjoyment of tracking athletes in the years, months and now days leading up to the 2016 Olympics.

Beginning with the November 2015 issue and running through July 2016—a month before the start of the Olympic swimming events in Rio on Aug. 6—Swimming World Magazine will bring you its top 9 upsets in the individual events in Olympic history—in particular, in the last 50 years. This month:

#7

[PHOTO PROVIDED BY UNIVERSITY OF FLORIDA MEDIA RELATIONS]



ANTHONY NESTY BEATS THE GREAT ONE!

In the 1970s, there was Mark Spitz. In the 2000s and beyond, there was and is Michael Phelps. But in between—in the mid-to-late 1980s—the best male swimmer in the world was Matt Biondi.

Leading into the 1988 Olympics, Biondi had broken long course world records seven times in the 50 (3) and 100 free (4). Those performances, coupled with his presence on three strong American relays, presented Biondi with the very real possibility of winning seven gold medals in Seoul.

Biondi stood 6-6. He was handsome, articulate and grounded, and he moved with the efficiency of speed through water that could take your breath away. Coach Stu Kahn initially helped him engineer his technique when Matt was an age-group swimmer; in college, he refined that technique under the tutelage of Coach Nort Thornton at Cal; thereafter, he continually honed his skill as a result of his high personal penchant for detail, organization and excellence.

And in lane five, with 25 meters remaining in the 100 meter butterfly finals at the Seoul Olympics, Matt Biondi's grace and

power had not only propelled him into the lead by nearly one-half body length, but he was also well within reach of Pablo Morales' two-year-old world record (52.84).

To most spectators and competitors, the race for the gold medal seemed over...but not to Anthony Nesty.

Swimming over in lane three, the 20-year-old from Suriname was charging toward the finish.

COMING OUT OF NOWHERE

Suriname? Yes, it's a tiny country of about 560,000 people on the northeastern shore of South America. To the south lies Brazil; to the west, Guyana; and to the east, French Guiana. Suriname is about the size of the state of Georgia, and in 1988, there were only ten 25-meter pools and one six-lane, 50-meter pool in the entire country. Nonetheless, at the age of 16, Nesty placed 21st in the 100 meter butterfly at the 1984 Olympics in Los Angeles with a time of 56.15. With the support of his home coach, Kenneth McDonald, his parents contacted the Bolles School in Jacksonville, Fla., and

BY CHUCK WARNER

Matt Biondi was below world record pace at the 50 of the 100 meter fly at Seoul, but that didn't concern Anthony Nesty (above), who turned in fifth a half-second behind. "I knew there were a few guys in the field who would take it out fast, but I'm not one of them," he said. "I just sit back and have a pretty good second 50 (27.98 to Biondi's 28.48)."

he enrolled in August of 1984 as a high school sophomore.

Like many swimmers, Anthony went through periods of time as an age grupper when he loved the sport and periods when he didn't. At 14, a nudge from his dad helped him stay in the sport. When he moved from the relatively underdeveloped country of Suriname to the modern conveniences in the USA, he might have been distracted from applying himself in the pool. But the self-effacing and humble young man recognized the huge opportunity he was given in coming to the United States, and he was determined to capitalize on his parents' investment in his future.

The Bolles coach at that time was Gregg Troy, who, in 2012, would become the head coach of the U.S. Olympic men's swim team. Coach Troy has a demanding style of training swimmers that includes a rather fearless approach to training and performance progressions. The coach and swimmer had set their sights on breaking Pablo Morales' high school record in the 100 yard fly (48.06 from 1983) and competing for a medal at the Seoul Olympics.

Most swimmers adapt gradually to the workload the Bolles athletes undertook, but Nesty adjusted relatively quickly. By November 1985, as a junior, he had clocked the fastest high school time in the 100 yard butterfly (49.04) and eventually ended the 1985-86 season with the No. 2 time behind Mark Fiorito of Redwood, Calif. (48.49).

In his senior year at the Florida High School Championships, his poor start in the 50 free landed him in a disappointing third place. What followed was a continual warm-down before the 100 fly in which he lowered then world record holder Morales' national high school standard to 47.60. His first remarks to Coach Troy after the landmark butterfly performance says a lot about Anthony Nesty: "Sorry I didn't win the 50."

The following summer (1987), Nesty swam the 100 meters in 53.89 to win the Pan American Games and seemed to be in a great position for the Olympic year as he entered Randy Reese's program at the University of Florida.

Unfortunately, the college rigors kept Anthony out of intercollegiate competition during his freshman season—therefore, he missed the chance to develop his racing skills at the 1988 NCAA Championships. He also didn't perform at that year's USA indoor nationals in late March—where Biondi finished third in 53.65, just behind Great Britain's Andy Jameson (53.57) and Pablo Morales (53.62).

Finally in June, Nesty did appear in a major competition in the USA: the Pepsi Open in Charlotte, N.C. (today's Arena Pro Swim Series at Charlotte), where he won the 100 fly in 55.44 and placed second in the 200 in 2:03.79 while in the midst of heavy training.

OLYMPICS

Before the Games in Seoul came to a close, Matt Biondi would earn seven medals, five of them gold. The speed he exhibited was beyond anything the world had previously seen in a swimming pool. He swam the fastest 200 meter freestyle relay leg in the 800 free relay to that point in history (1:46.44) to bring the USA from behind

for a world record-setting victory. He was a part of world records in the 400 free relay (splitting 47.81) and the 400 medley relay (notching a 52.38 butterfly leg), and he beat arch rival Tom Jager in the 50 free with a world record (22.14) as well. And his 100 freestyle gold medal swim of 48.63 established an Olympic record.

But shortly after the 100 fly, Biondi would say, "Watching the tape of the race makes me sick to my stomach."

STOPPING THE CLOCK

Despite his rocky first year of college, Nesty went to Seoul with high expectations, thinking he could swim faster than Morales' world record. His 53.50 in the preliminaries qualified him third for the finals. Coach Troy pointed out that his first 50 had been a bit slow, as was his turn. He advised Nesty, "Be faster on the first length without *trying* to be faster." In other words, perform a quicker start and turn, but—as Troy had coached him for years—build toward the second length and accelerate to the finish.

That night in finals, Biondi turned in 24.53 at the 50—ahead of Morales' world record pace (24.59)—and leaving Nesty a half-second behind in fifth place. With 15 meters remaining, the American owned a commanding lead. But Matt Biondi took two breaths in his last three strokes, and more problematically, judged that he was too close to the wall to take an additional stroke and, therefore, lunged, reached and kicked to the wall.

Meanwhile, Nesty put his head down on his last five strokes and landed his hands on the touchpad perfectly, gaining the lead for the first time in the last eighth of an inch of the race. Nesty turned off the clock at 53.00, with Matt Biondi touching in 53.01.

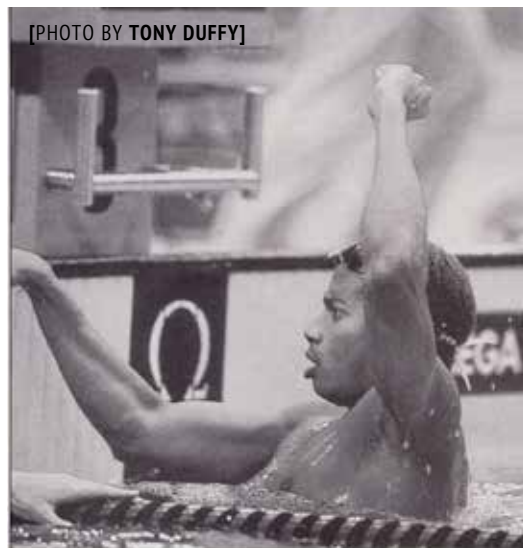
HUMBLE HERO

For the first time in history, the country of Suriname had an Olympic medal winner—and it was gold. Nesty's homeland exploded with adulation. While most swimmers waved to the Olympic swimming venue crowd walking up to the awards podium, Anthony Nesty looked into the TV camera in front of him, waved and said, "Hi, Mom."

Upon Nesty's return to Suriname, he was driven through the streets in a government-supplied motorcade. Upon reaching his final destination, Nesty was showered with money. Anthony had achieved such an enormous breakthrough for Afro-Caribbeans that he had instantly become a national hero. Suriname placed his image on a bank note as well as on gold and silver coins. The indoor stadium in Paramaribo was renamed for

him, and Suriname Airlines named a plane for him.

Anthony Nesty's performance proved to be more than just one of *Swimming World's* top nine Olympic upsets. In 1990, Nesty won gold in the Goodwill Games and won again at the World Championships in 1991. In 1992, he finished third in the Barcelona Olympics.



[PHOTO BY TONY DUFFY]

After beating Matt Biondi by 1-hundredth of a second in the 100 fly at Seoul, Anthony Nesty reacted with a fist pump. For the first time in history, the country of Suriname had an Olympic medal winner—and it was gold. While most swimmers waved to the Olympic swimming venue crowd walking up to the awards podium, Nesty looked into the TV camera in front of him, waved and said, "Hi, Mom."

Today, Anthony Nesty is the respected associate head coach at the University of Florida. He assists Coach Troy, helping new generations of young swimmers realize their dreams.

Author's Note: *Twenty years after the Nesty-Biondi 1-hundredth finish in the 100 butterfly in Seoul, there was another one in Beijing when Michael Phelps famously out-touched Milorad Cavic, also by 1-hundredth of a second. Cavic, like Biondi, swam collegiately at Cal. At the 1988 ASCA World Clinic, Coach Thornton quipped that Matt took the week off when the team worked on butterfly finishes.* ❖

Chuck Warner is a part of Swimming World Magazine's editorial board and author of "Four Champions: One Gold Medal" and "And Then They Won Gold." Both books are available for purchase online at www.SwimmingWorld.com. Next month: "Top 9 Olympic Upsets: #6."

Michael Phelps put on a show at USA Swimming's summer nationals, finishing 2015 with the top world rankings in three events: 100 and 200 meter fly plus the 200 IM.

[PHOTO BY SUE BORST]

5 TOP STORIES OF 2015

BY JASON MARSTELLER

1. KATIE LEDECKY MAKES HISTORY

Katie Ledecky won her third straight *Swimming World* World Swimmer of the Year award after accomplishing an amazing freestyle sweep at the 2015 World Championships.

Not only did she cruise to victory in the 400, 800 and 1500 meter freestyles in Kazan—setting world records in the 800 and 1500—but she also beat a stacked 200 freestyle field to become the first swimmer to win the 200-400-800-1500 freestyle events at a major international event.

In fact, she has yet to be defeated in a major international race, winning one Olympic gold medal plus nine World Championship and five Pan Pacific titles.

2. MICHAEL PHELPS FINDS POST-DUI REDEMPTION

Michael Phelps came out of rehab rejuvenated following his second DUI in September 2014. With a new clean no-alcohol, plenty-of-rest training plan, Phelps put in the work and swam himself back into the best shape of his life. That's a scary proposition for the rest of the swimming world.

With Phelps bypassing the 2015 World Championships due to sanctions levied following his DUI, the "Greatest Swimmer of All Time" put on a show at the 2015 USA Swimming summer nationals en route to his 10th *Swimming World* American Swimmer of the Year award.

With butterfly rival Chad le Clos talking trash a day ahead in Kazan, Phelps continued to get the last laugh each and every day as he posted the top world rankings at San Antonio in a trio of events: 100 and 200 meter fly (50.45, 1:52.94) plus the 200 IM (1:54.75).

3. SHALLOW WATER BLACKOUT PREVENTION REACHES NEW HEIGHTS

Although 2015 certainly was filled with a bevy of fast swims and a serious focus on competitive swimming storylines, the sport of swimming took this year to get even more serious about preventing shallow water blackout deaths.

Just three years after losing a teenage swimmer, Louis Lowenthal, to shallow water blackout, North Baltimore's Bob Bowman

and Michael Phelps both took leadership roles as May 31 was named National Shallow Water Blackout Prevention Day as part of National Water Safety Month.

The sport continues to try to find ways to impress upon its youngest swimmers the dangers of underwater work, even though it is necessary to become an elite swimmer.

4. THE LOCHTE TURN

In one of the quickest turnaround decisions ever made by FINA, the Ryan Lochte IM turn was banned shortly after he used it at the 2015 World Championships.

Earlier in the year, Lochte and SwimMAC head coach David Marsh began toying with Lochte's turn after the breaststroke leg of his IMs, having Lochte kick underwater for 10 meters on his back before turning over and finishing the swim freestyle.

This new technique caused an uproar around the world, resulting in much debate. FINA came out with a clarification a month after the 2015 World Championships:

"Being on the back when leaving the wall for the freestyle portion of the individual medley is covering more than one quarter of the distance in the style of backstroke, and is, therefore, a disqualification. Backstroke swimming is only defined as being on the back."

5. BODY ISSUES

Body issues certainly were at the center of some of *Swimming World's* most read articles online this year.

Natalie Coughlin appeared nude in *ESPN The Magazine's* seventh annual Body Issue in 2015, which demonstrated the positive side of the sport when it comes to the portrayal of the female body. Coughlin's appearance in the fitness-first layout drew widespread support.

Later in the year, *Swimming World's* Courtney Bartholomew looked at the dark side of body portrayal that can lead to eating disorders. With both sides of the story told, it helped shine a light on the positive and negative ways physical fitness can be portrayed. ❖

THE STATE OF U.S. SWIMMING: *Thumbs Up!*

New swimming facilities in the United States are keeping pace with the country's growing number of competitive swimmers.

USA SWIMMING FACILITIES

BY CHUCK WARNER

The quality and quantity of swimming facilities in the United States has long been a major advantage of “The American Swimming Team” in its competition with the rest of the world. In the USA, there are about 64,000 pools that can be used to conduct practices or competitions. These facilities have commonly been provided by municipalities and, in particular, educational institutions. For example, in the 1930s, most universities in the Big Ten Conference and Ivy League built six-lane 25-yard pools with large spectator viewing areas. When having a 50-meter course for both the intercollegiate team and for student recreation came to be seen as desirable in the 1970s '80s and '90s, many universities began replacing their old facility with a new aquatic center.

In the 1960s, Charlie Keating was a pioneer in creating club self-reliance when he successfully spearheaded an effort for the Cincinnati Pepsi Marlins to build their own facility. SwimAtlanta, Mecklenburg and Dynamo Swim Clubs followed suit and built their own facilities in the 1980s.

But in the last six years, more than 1,600 pools have closed across the USA, reports Mick Nelson, who since 2005 has served as director of USA Swimming's Facility De-

velopment Program.

“Most of those were about 40 years old and poorly maintained,” explains Nelson, whose office has been involved in the development of more than 125 new facilities. “Many cities have had to focus their attention and budget on police, firemen and street repairs. Parks and pools have taken a back seat, and many have simply closed. The 125-plus new facilities are only the ones we were involved with. There are many more that the major consultants also designed and built.”

INDEPENDENCE IS TRENDING

USA Swimming estimates that 10 years ago, 7 percent of coaches owned their own club compared to nearly 20 percent today. Some coaches have taken a “leap of faith” to build their own facility for their club. North Baltimore Aquatic Club owner and coach, Murray Stephens, did just that when he and his wife purchased the historical Meadowbrook facility in 1986 and completed renovations in 1995.

Another prolific example is Mike Koleber's Nitro Swim Team in Austin, Texas, where the coach has built two indoor 50-meter pools with teaching pools to house their swim school. Nitro's first site was completed in 2007. It alone currently conducts a

swim school with reportedly 2,000 students and a competitive team of about 1,000.

Coach Jim Wood is winning his 11-year battle to acquire land and build a home for his team in the tight commercial market in central New Jersey (just 30 miles from Manhattan). After reviewing more than 50 sites, Coach Wood's Berkeley Aquatic Club (BAC) is completing a huge facility in New Providence, which will be one of the largest privately-owned aquatics facilities on the east coast. In the main aquatic center is a 25-yard by 50-meter pool, with a 3-lane 25-meter pool. The adjoining 50,000 square-foot building includes a 30-foot by 50-foot teaching pool, an aqua therapy pool as well as spacious meeting rooms, a fitness center, a yoga room, staff offices and a pro shop.

— continued on 18



After reviewing more than 50 sites, Coach Jim Wood's Berkeley Aquatic Club is completing a huge facility in New Providence, N.J., which will be one of the largest privately-owned aquatics facilities on the east coast. Pictured are BAC's new facility (at left)—in its final stages of completion—and old facility (above).

[PHOTO PROVIDED BY BERKELEY AQUATIC CLUB]



STATE OF SWIMMING – cont'd from 17

More and more American ingenuity seems to be taking hold in new facility development. Coach Koleber found team parents who became private investors and, thus, avoided bank funding. Similarly, at BAC, Coach Wood boasts a 38-year resumé of successful facility ownership in Berkeley Heights, and has earned private funding assistance.

“We believe that all aquatic facilities should be financially sustainable,” explains Mick Nelson. “If the facility does not cover its total operational cost plus an additional 10 percent, then the business plan is faulty. Learn-to-swim, adult exercise & recreation and competitive swimming all need to work hand-in-hand to make sure the facility is on firm financial ground and is a community asset.”

More than ever before, coach-owned clubs are taking the risk to nurture the development of swimmers from “cradle to grave” that was once a hallmark of Australian Swimming. This effort, coupled with the continued cooperation from those controlling the beautiful institutional and municipal aquatic centers around the United States, bodes well for the future of the growing number of competitive swimmers. ❖

USA SWIMMING MEMBERSHIP

BY ANNIE GREVERS

What do the years 2001, 2005, 2009 and 2013 have in common? They all mark the post-Olympic surge in USA Swimming membership. And these spikes become more substantial with each quadrennium.

“You can go back seven or eight quads, and see that we enjoy a significant spike every quad,” says Pat Hogan, USA Swimming’s Club Development Managing Director. “2013 was the biggest year we’ve ever had, with a 13.2 percent rise (in year-round swimmers). After Beijing, we saw an 11.3 percent spike (2009).”

Why more excitement after the 2008 and 2012 Olympics than any other? Hogan points out these past two Olympics had some focal points fueling the masses.

Michael Phelps was on his quest to win eight gold medals in 2008, and the viral “Call Me Maybe” video caught the world by surprise in 2012. Seeing a group of serious athletes being able to loosen up in their preparations before the biggest meet on the planet made swimming look “very classy,” according to Hogan.

But what about the years following that spike?

Over the past four quadrenniums, the middle years (or Winter Olympic years) have seen numbers fall up to 1.7 percent or rise a scant 3-tenths of a percent. The challenge of keeping swimming exciting after the Olympic year begins with proper preparation for the influx of athletes after the Olympics, Hogan says.

“2013 resulted in 40,000 new members. Divide that among 59 LSCs, and that’s 678 new swimmers per LSC. Hopefully, those LSCs were planning ahead with their meet schedule and their team structure.”

Hogan advises clubs to plan on new swimmers swarming and, perhaps, make sure the clubs add meets and training groups to the schedule to make year-round swimming an exceptional experience for the athletes.



“2013 resulted in 40,000 new members. Divide that among 59 LSCs, and that’s 678 new swimmers per LSC. Hopefully, those LSCs were planning ahead with their meet schedule and their team structure.”

— Pat Hogan

Club Development Managing
Director, USA Swimming

don’t have sufficient pool space—those challenges are going to exist. The good news is most people are aware of that trend. Our retention rates tell me we’re doing a good job.”

Over the past six years, there has been a 72 percent overall retention rate of club swimmers. Thirteen-and-over swimmers tend to stick around 89 to 90 percent of the time, which shows the commitment level swimmers learn early on through the sport.

“We would like to be better with our 12-and-under retention rate—we’re at about 58 percent. But this aligns with the natural progression of parents and children exploring opportunities, which is healthy,” Hogan assures.

This past “swimming” year (Sept. 1, 2014-Aug. 31, 2015) shows a minuscule drop in membership, down by only 74-hundredths of a percent (or 2,500 athletes) to 337,080 year-round swimmers. If Hogan had to give the state of 2015 USA club swimming membership a grade, he’d give it a B-plus.

“We had a huge increase (40,000 swimmers in 2013). We’d never had anywhere close to that. In 2009, there were still less than 30,000 new swimmers. So it’s only natural that there would be a slight correction.”

The one slump in the retention stats are with the 10-and-under swimmers, many of whom are “being taken care of by other aquatic opportunities” (swim schools, summer league, lessons) or are simply still “shopping the market,” as Hogan says.

USA Swimming’s SwimToday campaign was launched in 2012 and serves as a direct link for parents to locate a nearby swim team and perpetuate the swimming progression, making it easier than ever to stay in “the funnest sport” after concluding lessons.

“This campaign has been successful,” Hogan said. “And we anticipate even more success in this coming year.” ❖

RETENTION RATES

“We talk to coaches about preparing for the Olympic bump—‘What are you doing to prepare and accommodate that growth?’ Some clubs are able to accommodate, some

BACKSTROKE

REACH FOR THE SKY!

DEMONSTRATED BY DANIELLE GALYER
PHOTO BY PETER H. BICK

> THE ARM RECOVERY SETS THE TEMPO AND TURNOVER RATE OF A BACKSTROKER.

> RECOVER BY LIFTING THE THUMB OUT OF THE WATER FIRST AS IF YOU WERE SHAKING SOMEONE'S HAND. THIS WILL RECRUIT MORE MUSCLES, INCLUDING THE BICEP DURING THE ARM LIFT.

> AVOID LEADING WITH THE BACK OF YOUR WRIST OUT OF THE WATER SINCE THIS PUTS UNNECESSARY STRESS ON THE SHOULDER AND WILL CARRY UNNECESSARY WATER AND WEIGHT INTO THE AIR.

> HALFWAY THROUGH THE RECOVERY, QUICKLY ROTATE YOUR HAND IN A SNAPPING MOTION SO THAT THE PALM IS FACING OUTWARD.

> SLICE YOUR HAND INTO THE WATER, LEADING WITH THE PINKY.

> THE SNAPPING ROTATION OF THE HAND SHOULD BE TIMED WITH THE BODY ROLL TO GENERATE FORWARD MOMENTUM.



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2015 ATHLETES OF THE YEAR:

DIVING, POLO, SYNCHRO, DISABLED SWIMMING

BY JASON MARSTELLER

SHI TINGMAO,
CHINA
Female Diver of the Year

Shi picked up a trio of medals—including two gold—at the 2015 FINA World Championships. She won the women's three-meter springboard and paired with Wu Minxia for the 3-meter synchro win. She took silver in the one-meter event.



[PHOTO BY JOAO MARC BOSCH]

QIU BO,
CHINA
Male Diver of the Year

Qiu closed out the 2015 FINA World Championships with his third straight victory on the men's 10-meter platform event. He also finished third in the FINA World Series.



[PHOTO BY BOBBY YIP, REUTERS]

ASHLEIGH JOHNSON,
USA
Female Water Polo
Player of the Year

Johnson picked up her second straight award, as the Princeton All-American was named the top goalkeeper at the 2015 FINA World Championships. She also earned the MVP of the Championships final.



[PHOTO BY BEVERLY SCHAEFER/
PRINCETON ATHLETIC COMMUNICATIONS]

[PHOTO PROVIDED BY SERBIAN WATER POLO]



DUSKO PIJETLOVIC, SERBIA

Male Water Polo Player of the Year

Pijetlovic, already a legendary player with two world titles and two Olympic bronze medals, led his club team, Pro Recco, to Italian and European Cup titles. He also led Serbia to wins in the FINA World League and World Championships as the tournament MVP.

** The Water Polo Players of the Year were selected by three-time U.S. water polo Olympian Wolf Wigo. A former captain of the USA Water Polo men's national team, Wigo now coaches water polo at UC Santa Barbara.*

[PHOTO BY JOAO MARC BOSCH]



SVETLANA ROMASHINA, RUSSIA

Synchronized Swimmer of the Year

Romashina, who won the Synchronized Swimmer of the Year award in 2013, ran her career title tally to 19 with four more gold medals at the 2015 FINA World Championships. She won gold in the solo technical, duet technical, duet free and free combination events.

[PHOTO PROVIDED BY
USOC COMMUNICATIONS]



REBECCA MEYERS, USA

Female Disabled Swimmer of the Year

Meyers put on a show at the 2015 IPC Swimming Championships in Glasgow, Scotland, UK this summer. Swimming in the S13/SB13/SM13 classification, she set a trio of world records and won gold in the 400 meter free and 200 IM. She also took fourth in the 50 free, 100 free and 100 breast.

[PHOTO BY LUC PERCIVAL]



IHAR BOKI, BELARUS

Male Disabled Swimmer of the Year

Boki nearly had a gold-medal sweep in the S13/SB13/SM13 classification at the 2015 IPC Swimming Championships in Glasgow. In addition to setting four world records, he won six gold medals in the 50 free, 100 free, 400 free, 100 back, 100 fly and 200 IM. He also took silver in the 100 breast.

** S13, SB13, SM 13 are visual impairment classifications for disabled swimmers. S represents freestyle/backstroke/butterfly; SB, breaststroke; SM, individual medley. ❖*

WHERE VOLUME MEETS INTENSITY

Jordan Wilimovsky, distance freestyler extraordinaire, not only finished third at the 2015 men's Division I NCAA's in the 1650 for Northwestern—his first NCAA podium finish—but he also was last year's 10K world open water champion and *Swimming World's* Male Open Water Swimmer of the Year.

Distance training has changed considerably over the years. The key is finding the balance among endurance, speed work and training at critical practice speeds.

[PHOTO BY PETER H. BICK]

BY MICHAEL J. STOTT

In the mid-1970s when American distance swimming volume was at its zenith, Olympic, world and national champions such as Brian Goodell, Bobby Hackett and Australian Stephen Holland routinely logged 100,000 to 120,000 meters per week. At Mission Viejo, Coach Mark Schubert offered 14 weekly practices and required 12. Goodell, prior to winning the 400 and 1500 meter freestyles in Montreal in 1976, frequently attended 13 sessions and occasionally a 14th. Truth be told, high, grueling, unending sets were the global order of the day for the very best distance swimmers.

"No more," says University of Florida and former Olympic coach Gregg Troy. "While yardage is one component, distance training is also about focus and how well you do the yardage. You've got to find what is right for each individual with whom you are working. The problem is that the balance is different for each individual. Coach and swimmer need to work together to determine what that balance is.

"Obviously, the aerobic component is larger as the event gets longer, so you are balancing athlete attitude, skill set, event, point in swimming career with their natural aerobic capacity—and that varies by individual. There are some swimmers who are

aerobic animals," he says. "When I worked with Peter Vanderkaay (four-time Olympic medalist), his red blood cell counts were off the charts, so he had some natural advantage on the aerobic side. (Former Katie Ledecky coach Yuri Sugiyama noted that Ledecky, at age 14, had "a tremendous aerobic engine." Some things haven't changed.)

"For a coach training a distance swimmer, it is a chess game. How much volume do you do? When do you do it? It depends upon the age and attitude of the athlete," says Troy.

THE RIGHT MINDSET

It also helps to have the right mindset. McGee Moody is building a formidable distance program at the University of South Carolina (e.g., Akram Mahmoud, sixth in the 1650 at 2015 NCAA's.) In Columbia, he classifies distance groups as 500 and below, and 500 and over (see **sample South Carolina sets, page 25**).

Helping him there is associate head coach Mark Bernardino, legendary University of Virginia head man for 35 years, who has coached a number of NCAA and U.S. national champions, among them Cara Lane and Fran Crippen. Bernardino believes elite distance freestylers share common charac-

teristics that include a positive attitude and mental toughness.

"They are fearless, self-motivated and relentless in their pursuit of excellence. They love challenges and are unafraid to embrace pain," he says. "It's one thing to overcome pain; it's another to embrace it. The best distance freestylers have the capability to embrace it as a part of their daily training regimen."

The best also need to be well-grounded in the disciplines of pace, stroke rate and distance per stroke.

"You need to be able to swim repetitively at the pace you intend to race and to condition the body to handle the stress of the race," says Dave Kelsheimer, assistant U.S. Olympic open water coach and club mentor to Jordan Wilimovsky, 2015 10K world open water champion and *Swimming World's* Male Open Water Swimmer of the Year.

"It doesn't do you any good to perform at the pace, stroke rate and stroke length in isolation. You need to be able to do it under pressure. And the only way to encourage the body to adapt is pushing through volume and intensity.

"First and foremost, we stress stroke efficiency," says Kelsheimer. The Team Santa

Back in the 1970s, high, grueling, unending sets were the global order of the day for the very best distance swimmers. (Pictured: Coach Mark Schubert and Olympic gold medalist/world record holder Brian Goodell of Mission Viejo, circa mid-1970s)

Monica coach has worked with Wilimovsky for the last five years on improving his stroke count, controlling stroke rate and recovery to maintain and increase speed at race end. “Through early race pace efficiency, Jordan is able to be strong on the back end,” says Kelsheimer. “First, it is technique-driven, and, secondarily, it is about building the engine” (see **sample Team Santa Monica sets, page 25**).

DISTANCE PER STROKE

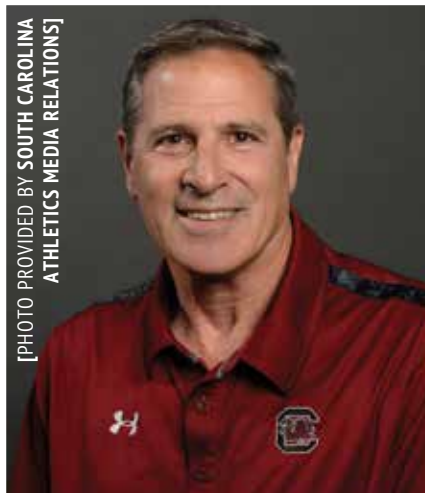
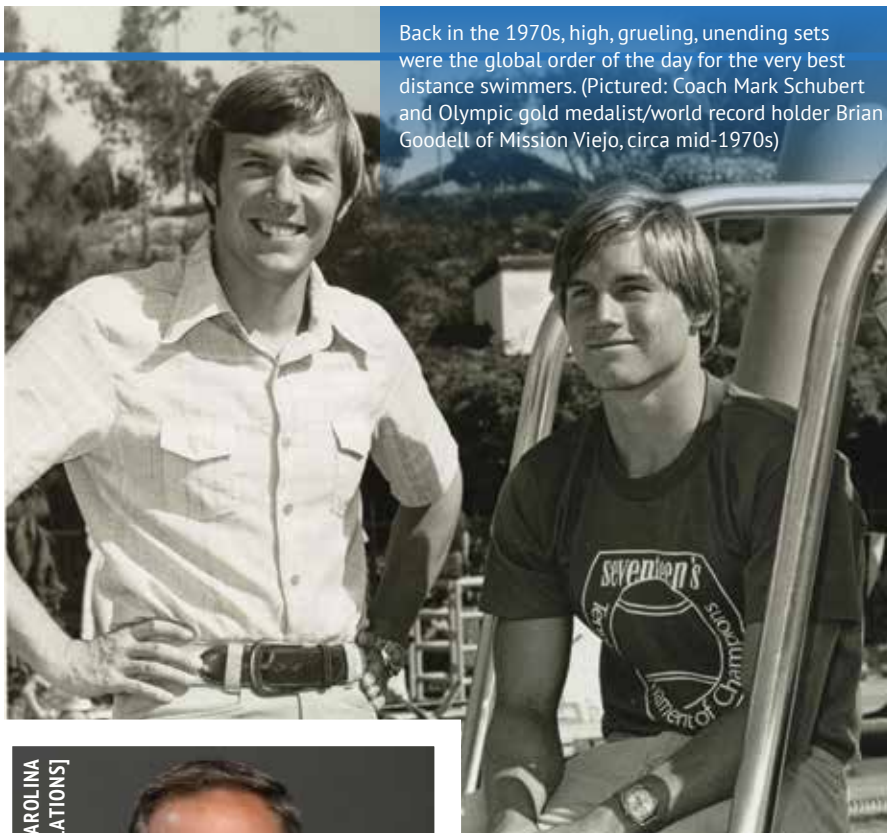
Peter Banks, now the national performance director for Swim Ireland, coached American Brooke Bennett to three Olympic gold medals. After securing first in the 800 meter free in Atlanta, Banks and Bennett spent the next four years leveraging her high stroke tempo and increasing her distance per stroke. “DPS was crucial in her ability to win gold in Sydney,” Banks says.

Catherine Vogt, University of Southern California assistant, has served as a head coach of numerous U.S. and international open water squads, including the 2015 FINA World Championships. In 2012, she coached Haley Anderson to Olympic silver in the open water 10K. In September 2015, she and Kelsheimer were named recipients of USA Swimming’s Glen S. Hummer Award, given annually to those making contributions to long distance swimming.

Recently appointed as head Olympic open water head coach for Rio, Vogt shares Banks’ opinion on DPS: “We are really working on being efficient and maximizing distance per stroke. We do that in a number of ways. I love using snorkels...maximizing a swimmers’ strengths and then working on weaknesses. I want swimmers to feel challenged but also enjoy the work, so I try to mix it up, getting energy from other coaches on deck and from the swimmers themselves.

“Training sessions are going to be different depending on the group with whom I am working. If it’s open water swimmers, then I am thinking about the distance and a tighter interval and mental cues about racing. If it’s an 800-1500 group, I mix a longer swim with short rest, followed by great intensity. Rest will depend upon time of season and day of the week. If it’s mid-distance men, I decide if I want 50s race pace. With them, more rest is important; women can get their confidence from consistency.

“I also love 125s! Identifying what you want from the set and communicating that to the athletes is extremely important. I work hard to create an environment for athletes to race and to be engaged” (see **sample Vogt set, page 25**).



[PHOTO PROVIDED BY SOUTH CAROLINA ATHLETICS MEDIA RELATIONS]

“(Elite distance freestylers) are fearless, self-motivated and relentless in their pursuit of excellence. They love challenges and are unafraid to embrace pain. It’s one thing to overcome pain; it’s another to embrace it. The best distance freestylers have the capability to embrace it as a part of their daily training regimen.”

— **Mark Bernardino**
Associate Head Coach,
University of South Carolina

TAKING IT TO THE LIMIT

Bernardino’s engagement also involves a daily challenge.

“Being comfortable with being uncomfortable (echoes of Eddie Reese, Bill Rose and others) is a nice way to say it, but you want swimmers to have a sense of accomplishment,” says Bernardino. “You have to find their limits at different points in the season and push those limits. Once they get comfortable, we look for a whole new level of discomfort until it becomes comfortable and so on. Sometimes it takes two weeks, sometimes three, sometimes six, but you can’t give up. You keep finding a way to motivate and engage them in becoming comfortable in a spot they could never imagine.”

Taking it to the limit often works via the old “misery loves company” approach. Many, many U.S. superlative distance programs, past and present, have sported a cadre of tough aquanauts who butted heads in daily practice. While Schubert’s Mission Viejo “Animal Lane” was among the most celebrated 40 years ago, modern-day iterations abound under the likes of Harvey Humphries at Georgia, Josh White at Michigan, Bill Rose at MVN, Troy at Florida and so on.

At Team Santa Monica, Kelsheimer has assembled a squad of four young men who, in the last three years, have achieved Olympic Trials cuts in the 1500 meter free

— continued on 24

DISTANCE TRAINING – continued from 23

(all 15:40 or faster or under 15:25 in the 1650) and earned podium finishes at junior or senior nationals. “We provide a group environment where they feed off one another,” says Kelsheimer, who credits those feats to group camaraderie and a concentrated diet of IM work when not swimming distance free.

As does Ohio State men’s coach Bill Wadley: “Volume without skill is just a waste.” Once an aerobic base is established, Wadley likes to mix in a moderate amount of medley training, which “gives athletes a

slight recovery and an opportunity to rest the freestyle muscle groups before going back to an aerobic emphasis. Over six days of training, we may do two days of aerobic work, two days of flushing (non-free stroke work) and two days of quality or race-pace swimming,” he says.

STROKE TRAINING AND KICKING

At South Carolina, Tuesday mornings and Thursday afternoons are devoted to “engaging other muscles and other strokes,” says Bernardino. “Every athlete has to have a best stroke that is not freestyle, so the role of stroke and IM training is critical.

We swim a lot of 400, 300 and 200 IMs on Tuesdays and Thursdays. One example is two rounds of 8 25s; 2 back, 2 breast; 3 400 IMs swum as 25 build, 25 smooth, 25 fast, 25 smooth; then a small kick set.

“So, stroke training is very, very important. In many ways it is a mental relief because the athletes get a new challenge—one that is not always the same. It is something to have fun with. Swimmers all have a weak stroke, so they find a way to improve. Doing odd strokes helps both IMers and distance freestylers and can lead to breakthroughs, whether it be in a 500, 2000, 800 or a mile,” he says.

South Carolina coaches quantify the role of kicking in distance free as “massive. Gone are the days of the two-beat kick 1650. Now, it is eight-beat for a 500 and four- to six-beat for a mile,” observes Moody. The Gamecocks call their aggressive approach to the legs as “feeding the wolf,” a tone-setting practice regimen coined by former UVA coach Chip Cline that is designed to implant the notion that the last 50 of a 200 or final 100 of a longer event is to be done all-out.

“It’s not about saving your legs any more. It’s about having better conditioned legs to kick at high intensity for a long time. Especially in the early season, kicking is a great way to pick up aerobic capacity fast. On recovery days, sometimes the whole body doesn’t need recovery, just the upper body, so we’ll hammer the legs pretty good,” says Moody.

On most days, South Carolina swimmers will kick 15 percent of a workout—at a minimum. On Tuesday mornings and Thursday afternoons, up to 30 to 40 percent (2,500 to 3,500) of a main set will be devoted to kicking.

In Columbus, Buckeye swimmers devote approximately 9,000 to 11,000 yards—regardless of practice group—to the legs. Says Coach Wadley, “We have endurance kick days, quality kick days and all-out lactate kick days for sprinters and stokers” (see sample Ohio State kick set, page 25).

But back to Troy’s chess match. The reality remains: “You’ve got to work with the athlete you’ve got,” he says. “If they don’t have the capabilities, you don’t train them as a distance freestyler. If their strength is in distance, you train them in distance. Either way, you are constantly evaluating the athlete.” ❖

Michael J. Stott is an ASCA Level 5 coach whose Collegiate School (Richmond, Va.) teams have won eight state high school championships.



The advertisement features a smiling male swimmer with blue goggles around his neck, holding a large gold medal. The medal has a stylized 'H' logo at the top and a 'G' logo in the center, with the text 'ROWDY GAINES MASTERS CLASSIC' below it. The background is dark blue with a subtle pattern.

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SAMPLE SETS

SOUTH CAROLINA SETS

Mid-Distance Main Set (500 and Below)

Power/Muscular Endurance

Coach McGee Moody: "The focus of this set is to elevate the heart rate with the pull...then move to hold pace and tempo on the 100s...then practice switching gears on the power towers, imitating the final 100 of the 1650/1000. We want to create the mindset of powering home to the finish of the race. There is kick in the middle to tax the legs and add a different level of difficulty to the final round...then challenge to be as fast as possible in the final 200."

First interval is men/second interval is women:

- 1 x 400 pull (negative split @ 4:30/4:50)
- 4 x 100 swim (1650 goal pace @ 1:10/1:20)
- 6 x 50 Power Tower-Heavy @ 1:30
(25 power swim/25 float)
- [1:00 rest]
- 1 x 400 pull (negative-split @ 4:30/4:50)
- 10 x 50 Power Tower-Heavy @ :30 (power blast/:45 rest)
- 1 x 100 swim recovery
- [1:00 rest]
- 1 x 400 pull (negative-split @ 4:30/4:50)
- 4 x 100 swim (fastest average @ 1:10/1:20)
- 6 x 50 Power Tower-Heavy @ 1:30
(25 power swim/25 float with fins and paddles)
- 1 x 100 swim recovery
- 1 x 200 off the blocks (for time)

Distance Set (500 and Over)

Coach McGee Moody: "The focus of this set is to mimic the mile and the 1000, and to challenge them physically and mentally. Round 1 uses the 3 x 300s to set up the first 900 of the 1650, and the 6 x 100s to follow their race plan in the final 100s of the 1650. The goal is to execute their race plan throughout those swims."

"Round 2 has the same emphasis with the 1000. The 3 x 200s set up their 1000 and the 4 x 100s challenge them to race down the stretch. The goal is to execute their 1000 race plan."

"The final 800 for time is intended to make them overcome that pain and mental stress of the previous two rounds and push beyond their limits."

First interval is men/second interval is women:

- 1 x 600 pull @ 6:45/7:20
- 3 x 300 swim @ 3:15/3:30 (mimic first 900 of mile)
- 6 x 100 swim @ 1:05/1:10 (mimic last 600 of mile)
- 1 x 100 recovery
- 1 x 400 pull @ 4:30/4:50

- 3 x 200 swim @ 2:10/2:20 (mimic first 600 of 1000)
- 4 x 100 swim @ 1:05/1:10 (mimic last 400 of 1000)
- 1 x 100 recovery
- 1 x 800 swim for time

TEAM SANTA MONICA SETS

Coach Dave Kelsheimer: "The following are Jordan Wilimovsky sets from his senior year of high school."

1st set: SCY

4x the following:

- 2 x 75 @ 1:15 (last 50 fast, all 75 fast push)
- 1 x 150 @ 2:00 (dive from blocks, swim fast)

2nd set: LC

3x {10 x 100 with 1-min. rest between:

- 10 x 100 @ 1:10 (1500 pace +2 secs) (Jordan held 63-62)
- 10 x 100 @ 1:20 (1500 pace) (Jordan held 62-61)
- 10 x 100 @ 1:30 (1500 pace -1 sec to -2 secs) (Jordan held 61-59)

VOGT SET

Swim LC in early September 2015

- One hour of warm-up kicking and fins/paddles (IM work, UW work)
- Pull 9 x 100
(odd 50s: middle 20 fast; even 50s: breathe 25R-25L @ 1:15)
- 400 @ 4:45 + 2 x 300 @ 4:00
(negative-split and last 100 fast LEGSSS)
- 400 @ 5:00 + 6 x 100 @ 1:20
(last 15 meters ALL OUT, 85 meters perfect stroke)
- 400 on 5:15 + 6 x 50 @ :50 (ALL FAST)

Coach Catherine Vogt: "400s were descend. We got a great effort on those and then got some great times on 50s."

OHIO STATE KICK SET (SCY)


6x the following:

- 4 x 100 with board and snorkels @ 1:20 ("going pretty hard")
- 50 EZ @ :45

Coach Bill Wadley: "2400 worth of kicking with very little rest." ❖



TOTAL ACCESS MEMBERS CLICK HERE
to download two additional South
Carolina sets done in October 2014.



At the Duel in the Pool in December between the USA and Europe, American Cody Miller beat world record holder Daniel Gyurta in the 200 breaststroke (SCM) while trimming 5-hundredths of a second off the American record. The next day, he added the U.S. mark in the 100 breast.

HERE COME THE AMERICANS!

BY ANNIE GREVERS

In 2015, it took a 59.60 in the men's 100 meter breaststroke to rank among the top 10 in the world. The only Americans to crack into that elite bracket were Cody Miller, a 2014 graduate of the University of Indiana, and Nic Fink, who wrapped up his eligibility as a Georgia Bulldog in 2015. The Brits may boast a world record holder [Adam Peaty] and a 59-flat 100 breaststroker [Ross Murdoch], while South Africa [Cameron van der Burgh] and Lithuania [Giedrius Titenis] have swimmers who dipped under 59 in 2015. But they all should have formidable American breaststrokers nipping at their heels this Olympic year.

[PHOTO BY PETER H. BICK]

MILLER MADNESS

Cody Miller made top 8 in one event at 2012 Trials—the 200 meter IM. But over the past two years, he has established himself as a breaststroking stud.

During Miller's 200 breast at the 2014 Phillips 66 Nationals, he pulled his groin and was forced to drop out of the 50 breast.

"I thought my meet was pretty much over. If I swam, I thought I probably wasn't going to swim very well," Miller recalled. Two days later, after not touching the water, he was able to dive in and swim the 100 breast. "My groin still hurt, but it felt OK enough for me to be confident," Miller said.

In the final, Miller darted to the finish and turned around to see a "1" beside his name along with the numbers 59.91. His jaw dropped and eyes bulged as he realized his feat. It was the first time he had clipped the one-minute mark, and it marked his first berth onto a major U.S. international team—the Pan Pacific Championships squad.

At World Championships in Kazan last summer, Miller finished ninth in the 100 breast (59.86) and earned a gold medal as a contributing member of the 4 x 100 medley relay.

Miller calls breaststroke a "full-fledged power stroke," and says he has seen a direct correlation between his strength in the weight room and his times in the pool. On the other hand, his stroke is also very "timing-driven."

"I find that in fly and free, the harder you try, the faster you go. But breaststroke doesn't always work that way. My instinct is to try harder—I'm working on maintaining my stroke count and trying not to ramp it up."

At 2012 Trials, Miller popped a few squats to warm up his legs before his preliminary 200 breast...and ended up popping his suit wide open as well! The heat was delayed for him to hastily change suits. He ended up making the semifinal. But he could laugh about it because, "I knew I wasn't going to make the team in 2012." He was shaving and tapering for the 2012 U.S. Open.

The 2016 Trials will not see Miller tapering for the U.S. Open again. He's an Olympic contender, and he said it's always on his mind: "It's really hard not to think about it. I try to shove the Olympics into the back of my brain for now. I'm going to try to approach it like any other meet—be confident and cocky, but humble and understanding at the same time."

Readers may wince at the word "cocky," but that internal belief that they're the best is often what gets contenders on the team.

WILDCARD WILSON

Andrew Wilson does not remember learning how to swim. His neighborhood pool was two blocks away, and the daily dip in the pool was routine from early childhood. Wilson attended the prestigious Phillips Academy, a boarding school in Massachusetts.

"Since I went to a boarding school, it was not feasible for me to do club swimming. I was just swimming two-and-a-half months out of each year," Wilson said. His training with David Fox and Tim Kelly led him to high school bests of 59.4 in the 100 yard breast and 1:59.9 in the 200 IM. Good times, but not NCAA Division I-caliber.

Wilson committed to swim for the Division III Emory Eagles, and he began training under head coach Jon Howell's guidance in 2012.

"The fall was rough—it took me a few months to get used to the training," Wilson recalls. But after the winter training trip, his body seemed adapted and ready for the new level of swimming—a level of swimming that shocked his coach, his teammates and himself.

At NAAs his freshman year in 2013, Wilson's 100 breast dipped down to a 55.44. His 200 breast was a 2:01.46, and his 200 IM, 1:51.40...*ridiculous time-hacking!* His sophomore year, Wilson continued to slice and dice his times, but his drops weren't as massive as he'd expected—a 54.26 in the 100 and a 1:58.54 in his 200 breast. Unsatisfied



[PHOTO BY GRIFFIN SCOTT]

In the final of the 100 meter breast at the 2014 U.S. nationals, Miller clocked 59.91. It was the first time he had clipped the one-minute mark, and it marked his first berth onto a major U.S. international team—the Pan Pacific Championships squad.

— continued on 28

Last summer at U.S. nationals, Wilson took the chain saw to his time in the 100 meter breast, dropping from a 1:02.5 to 59.65 in a single year. He vaulted to 12th in the world and won his first U.S. national title. "I like being under the radar. I'd much rather come out of nowhere," says Wilson.

U.S. BREASTSTROKE – continued from 27

with his sophomore year, Wilson had fire in his goggles at 2015 NAAs—he scorched to a 51.72 in the 100, a 1:52.97 in the 200 and a 1:46.23 in the 200 IM. He won all three events and set NCAA records every time he hit the pool, be it prelims or finals. *That's how you own a meet, ladies and gentlemen.*

Division III rules prevent swimmers from training with their collegiate coach out of season, so after summer stints training with Nation's Capital and Dynamo, Wilson decided it was time to move on from age group training.

He carried his career to Austin to train with Eddie Reese at Longhorn Aquatics in May and has opted to take the year off of school to give himself the best shot at a place on the U.S. Olympic team.

Taking a break from college and the college program can be an adjustment, but Wilson said his rigorous regimen doesn't allow much time or energy for anything else.

"I'm a fan of how much breaststroke we do here (in Austin)," Wilson said. "Here, I'm considered a breaststroker—not a breaststroker/IMer."

A competitive breaststroke crew of Longhorns (Austin Temple, Liam Lockwood and Will Licon, to name a few) accompany Wilson through the edifying struggle each day. Wilson does at least one necessary aerobic threshold breaststroke set of repeat 200s or 300s each week.

Wilson was quick to correct me when I repeated back to him his "favorite" type of set. "No, no...that's definitely not my favorite type of set. I hate those sets, but you just cannot swim a 200 breaststroke as well if you have not become familiar with that pain."

So what's necessary *and* fun in practice? "I like the fast effort, long rest sets—like repeat 50s or 40 50s, one fast/one easy," he said.

Last summer, Wilson proved he can swim long course as well. No, he can *dominate* long course. Wilson took the chain saw to his times again and went from a 1:02.5 to a 59.65 in a single year. His 59 was the only two-digit time in the race, vaulting him to 12th in the world and winning him his first U.S. national title.

We cannot expect these age grouper-esque drops from Wilson forever, but the ceiling has yet to be found for this tall talent who seemed to emerge from thin air.

"I like being under the radar," Wilson said.

"I'd much rather come out of nowhere."

Cat's out of the bag, Wilson. But your name still is bound to be a surprise to many next summer.

FAST AND FURIOUS FINK

Nicolas Fink concluded his collegiate career as a Georgia Bulldog at the 2015 NAAs, and he has moved into the ranks of the professionals.

"Participating in the Olympics has always been a fantasy that every competitive swimmer dreams of. It wasn't until the summer of 2013 that I realized that qualifying for the Olympics could be a real possibility," Fink recalls.

Fink had his breakout performance at World Championship Trials in 2013 when he clinched second in the 100 meter breaststroke, qualifying him for the 2013 World Championships in Barcelona.

He finished eighth in the World Championship final (59.84) and went on to qualify for Pan Pacs in the 100 the following summer. He finished fourth with a 1:00.24 at Pan Pacs and surprised the field with a silver in the 200 breast (2:08.94).

Fink bounces between walls well in short course yards, too, blazing to a 51.08 (100) and a 1:50.80 (200) at his final NAAs last March. At the 2015 World Championships, Fink knocked at the door of the one-minute barrier, turning in a 1:00.05 to finish 12th. Ten days later, at the Moscow World Cup meet, Fink stroked to a 59.52—his second time ever below 1:00 and a best time for the first time in more than two years.

The breaststroker has been hovering around the one-minute barrier for years now, and is hungry for progress.

[PHOTO BY PETER H. BICK]



Although Fink is finished with his collegiate eligibility, he does not feel detached from his Bulldog family: "Because I am still in school and still swimming with the team, things haven't really changed from the past four years. Yes, I don't get to compete with them on an official level, but every day I get to compete with them in practice, and it's been fun seeing meets from a different perspective."

Fink has jumped from semifinalist at the 2012 Olympic Trials to a legitimate contender for an Olympic spot (or two) in 2016. He has proven his speed and stamina, yet the Olympic hopeful admits candidly, "I haven't thought too much about Trials yet. Mentally, I'm more focused on everyday training and keeping myself motivated to be the best I can be for every practice."

QUIET CORDES

Kevin Cordes hit his stride in college, breaking NAG records, then NCAA records and American records. He won four straight 100 yard breast NCAA titles (the fastest, 50.04 in 2014). At 2014 NAAs, Cordes knocked the wind out of all watching, setting the American record of 1:48.66 in the 200 breast.

However, the superstar tripped over a series of unfortunate events between August 2013 and August 2014.

He false-started at the last event of the 2013 World Championships, the 4 x 100 meter medley relay, and cost Team USA gold in the event. In 2014, he bombed his 100 breast final at Phillips 66 Nationals in Irvine, then rebounded with a solid 200, qualifying him for Pan Pacs. At Pan Pacs, he seemed on the path to redemption and the World Championships spot with a swift 100 breast, but a not-so-sly hand maneuver to tear his goggles off disqualified him. Cordes was slammed by the media for his DQ habit, and responded with few words and his trademark smooth, powerful stroke.

In June 2015, Cordes made a major change in scenery. He uprooted from Tucson and landed in Singapore, where he is under the guidance of former Bolles School coaching legend (now head coach of Singapore Swimming) Sergio Lopez.

The duo was introduced through a friend, and Cordes talked over his goals with Lopez. Cordes told Yahoo Singapore, "He believes in me, and I believe in him." *The makings of a fantastic relationship.*

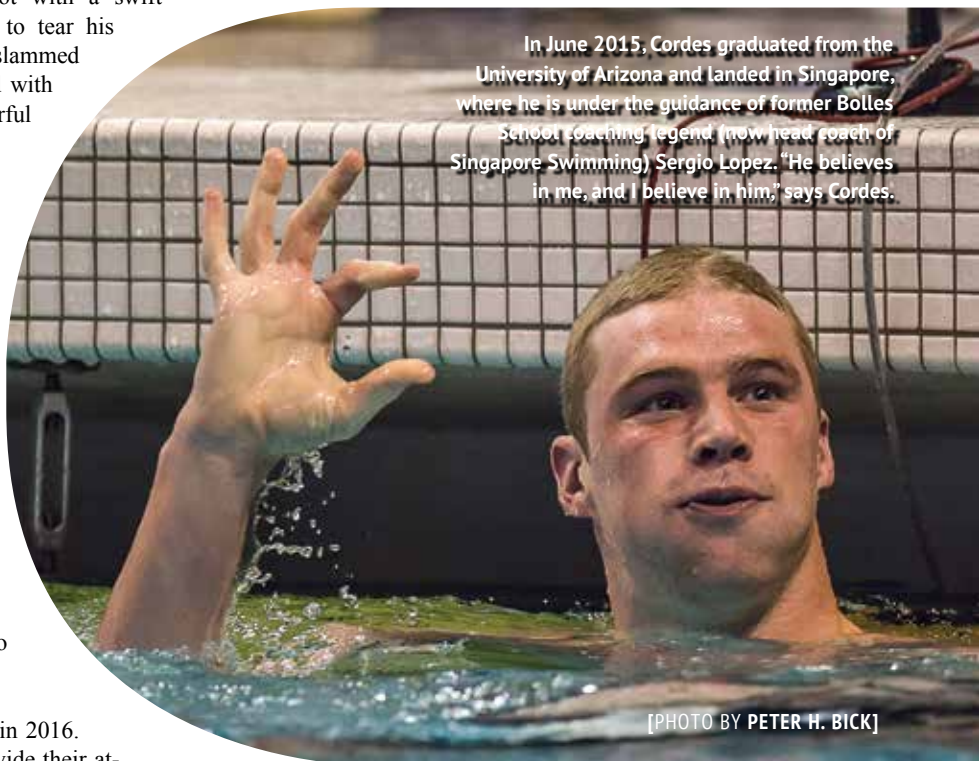
At 2015 World Championships, Cordes did more than make it through his swims legally. He won the bronze medal in the 50 breast (setting an American record of 26.76 in the semifinal) and took silver in the 200 (2:08.05), just 3-tenths behind German Marco Koch (2:07.76).

Team USA is ready to kick down the door in 2016. With Fink, Miller and Wilson not having to divide their attention between the books and the pool, and Cordes training under Zen master and Olympic breaststroker Sergio Lopez, the year is bubbling with possibilities. ❖



[PHOTO BY PETER H. BICK]

Olympic hopeful Fink admits candidly, "I haven't thought too much about Trials yet. Mentally, I'm more focused on everyday training and keeping myself motivated to be the best I can be for every practice."



In June 2015, Cordes graduated from the University of Arizona and landed in Singapore, where he is under the guidance of former Bolles School coaching legend (now head coach of Singapore Swimming) Sergio Lopez. "He believes in me, and I believe in him," says Cordes.

[PHOTO BY PETER H. BICK]

COMPILED BY JASON MARSTELLER

Following is a list of the world and American records set this past season for long course, short course meters and short course yards. The record progression begins with meets swum the first of the year for long course and Dec. 1, 2014 for short course yards and short course meters. The list was last updated Dec. 4, 2015. The initial time listed per event is the previous record.

WORLD RECORDS

LONG COURSE — WOMEN

800 METER FREESTYLE

8:11.00	Katie Ledecky, USA — Shenandah	6-22-14
8:07.39	Katie Ledecky, USA — Kazan	8-8-15

1500 METER FREESTYLE

15:28.36	Katie Ledecky, USA — Gold Coast	8-24-14
15:27.71p	Katie Ledecky, USA — Kazan	8-3-15
15:25.48	Katie Ledecky, USA — Kazan	8-4-15

100 METER BUTTERFLY

55.98	Dana Vollmer, USA — London	7-29-12
55.74sf	Sarah Sjöstrom, SWE — Kazan	8-2-15

LONG COURSE — MEN

50 METER BREASTSTROKE

26.62	Adam Peaty, GBR — Berlin	8-22-14
26.62pt	Cameron vd Burgh, RSA — Kazan	8-4-15
26.42sf	Adam Peaty, GBR — Kazan	8-4-15

100 METER BREASTSTROKE

58.46	Cameron vd Burgh, RSA — London	7-29-12
57.92	Adam Peaty, GBR — London	4-17-15

LONG COURSE — MIXED

400 METER MEDLEY RELAY

3:46.52	Australia — Perth	1-31-14
	(Ashley Delaney, Daniel Tranter, Alicia Coutts, Emma McKeon)	
3:45.87p	Russia — Kazan	8-5-15
	(Daria Ustinova, Kirill Prigoda, Daniil Pakhomov, Veronika Popova)	
3:42.33p	USA — Kazan	8-5-15

(Ryan Murphy, Kevin Cordes, Kendyl Stewart, Lia Neal)

3:41.71	Great Britain — Kazan	8-5-15
	(Chris Walker-Hebborn, Adam Peaty, Siobhan Marie O'Connor, Fran Halsall)	

400 METER FREESTYLE RELAY

3:23.29	Australia — Perth	2-1-14
	(Tommaso D'Orsogna, Cate Campbell, James Magnussen, Bronte Campbell)	

3:23.05	USA — Kazan	8-8-15
	(Ryan Lochte, Nathan Adrian, Simone Manuel, Missy Franklin)	

SHORT COURSE

* = FINA began recognizing the 200 meter medley and freestyle relays officially in late September 2013. The world records in these events are not necessarily the fastest legally swum performances. The initial time (marked with an asterisk) for these relays is the world best time.

SHORT COURSE — WOMEN

100 METER FREESTYLE

51.01	Libby Trickett, AUS — Hobart	8-10-09
50.91	Cate Campbell, AUS — Sydney	11-28-15

200 METER FREESTYLE

1:51.17	Federica Pellegrini, ITA — Istanbul	12-13-09
1:50.78	Sarah Sjöstrom, SWE — Doha	12-7-14

1500 METER FREESTYLE

15:22.68	Lauren Boyle, NZL — Wellington	8-9-14
15:19.71	M. Belmonte Garcia, ESP — Sabadell	12-12-14

50 METER BACKSTROKE

25.70	Sanja Jovanovic, CRO — Istanbul	12-12-09
25.67	Etiene Medeiros, BRA — Doha	12-7-14

100 METER BACKSTROKE

55.23	Shiho Sakai, JPN — Berlin	11-15-09
55.03	Katinka Hosszu, HUN — Doha	12-4-14

200 METER BACKSTROKE

2:00.03	Missy Franklin, USA — Berlin	10-22-11
1:59.23	Katinka Hosszu, HUN — Doha	12-5-14

100 METER BREASTSTROKE

1:02.36	Ruta Meilutyte, LTH — Moscow	10-12-13
1:02.36t	Alia Atkinson, JAM — Doha	12-6-14

100 METER BUTTERFLY

55.05	Diane Bui Duyet, FRA — Istanbul	12-12-09
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54.61	Sarah Sjöstrom, SWE — Doha	12-7-14
	200 METER BUTTERFLY	
2:00.78	Liu Zige, CHN — Berlin	11-15-09
1:59.61	Mireia Belmonte Garcia, ESP — Doha	12-3-14

100 METER INDIVIDUAL MEDLEY

56.86p	Katinka Hosszu, HUN — Dubai	9-1-14
56.70	Katinka Hosszu, HUN — Doha	12-5-14
56.67	Katinka Hosszu, HUN — Netanya	12-4-15

200 METER INDIVIDUAL MEDLEY

2:02.13	Katinka Hosszu, HUN — Dubai	8-31-14
2:01.86	Katinka Hosszu, HUN — Doha	12-6-14

400 METER INDIVIDUAL MEDLEY

4:20.83	Katinka Hosszu, HUN — Doha	8-28-14
4:19.86	Mireia Belmonte Garcia, ESP — Doha	12-3-14
4:19.46p	Katinka Hosszu, HUN — Netanya	12-2-15

200 METER MEDLEY RELAY

1:42.69*	<i>The Netherlands — Istanbul</i>	12-12-09
	(Hinkelien Schreuder, Moniek Nijhuis, Inge Dekker, Ranomi Kromowidjojo)	

1:44.81	Denmark — Herning	12-15-13
	(Mie Nielsen, Rikke Moeller Pedersen, Jeanette Otteson, Pernille Blume)	

1:44.04	Denmark — Doha	12-5-14
	(Mie Nielsen, Rikke Moeller Pedersen, Jeanette Otteson, Pernille Blume)	

200 METER FREESTYLE RELAY

1:33.25*	<i>The Netherlands — Istanbul</i>	12-11-09
	(Inge Dekker, Hinkelien Schreuder, Saskia de Jonge, Ranomi Kromowidjojo)	

1:37.04	Denmark — Herning	12-12-13
	(Pernille Blume, Jeanette Otteson, Kelly Rasmussen, Mie Nielsen)	

1:34.24	<i>The Netherlands — Doha</i>	12-7-14
	(Inge Dekker, Femke Heemsker, Maud van der Meer, Ranomi Kromowidjojo)	

400 METER FREESTYLE RELAY

3:28.22	<i>The Netherlands — Amsterdam</i>	12-19-08
	(Hinkelien Schreuder, Inge Dekker, Ranomi Kromowidjojo, Marleen Veldhuis)	

3:26.53	<i>The Netherlands — Doha</i>	12-5-14
	(Inge Dekker, Femke Heemsker, Maud van der Meer, Ranomi Kromowidjojo)	



Ryan Murphy

[PHOTO BY PETER H. BICK]



Natalie Coughlin

[PHOTO BY DAVID FARR]



800 METER FREESTYLE RELAY

7:35.94 China – Dubai 12-15-10
(Chen Qian, Tang Yi, Liu Jing, Zhu Qianwei)

7:32.85 The Netherlands – Doha 12-3-14
(Inge Dekker, Femke Heemskerk, Ranomi Kromowidjojo, Sharon van Rouwendaal)

**SHORT COURSE — MEN
50 METER FREESTYLE**

20.30sf R. Schoeman, RSA–P'maritzburg 8-8-09
20.26 Florent Manaudou, FRA – Doha 12-5-14

1500 METER FREESTYLE

14:10.10 Grant Hackett, AUS – Perth 8-7-01
14:08.06 Gregorio Paltrinieri, ITA – Netanya 12-4-15

50 METER BACKSTROKE

22.61 Peter Marshall, USA – Singapore 11-22-09
22.22 Florent Manaudou, FRA – Doha 12-6-14

200 METER BACKSTROKE

1:46.11 Arkady Vyatchanin, RUS – Berlin 11-15-09
1:45.63 Mitch Larkin, AUS – Sydney 11-27-15

100 METER BUTTERFLY

48.48 Yevgeny Korotyshekin, RUS – Berlin 11-15-09
48.44 Chad le Clos, RSA – Doha 12-4-14

100 METER INDIVIDUAL MEDLEY

50.71sf Ryan Lochte, USA – Istanbul 12-15-12
50.66 Markus Deibler, GER – Doha 12-7-14

200 METER MEDLEY RELAY

1:31.80* Russia – Istanbul 12-9-09
(Stanislav Donets, Sergey Geybel, Evgeny Korotyshekin, Sergey Fesikov)

1:32.83 Italy – Herning 12-12-13
(Stefano Pizzamiglio, Francesco di Lecce, Piero Codia, Marco Orsi)

1:30.51 Brazil – Doha 12-4-14
(Guilherme Guido, Felipe Franca, Nicholas Santos, Cesar Cielo)

200 METER FREESTYLE RELAY

1:20.77* France – Rijeka 12-14-08
(Alain Bernard, Fabien Gilot, Amaury Leveaux, Fred Bousquet)

1:23.36 Russia – Herning 12-15-13
(Vladimir Morozov, Sergey Fesikov,

Evgeny Lagunov, Nikita Kononov)
Russia – Doha 12-6-14
(Vladimir Morozov, Evgeny Sedov, Oleg Tikhobaev, Sergei Fesikov)

**SHORT COURSE — MIXED
200 METER FREESTYLE RELAY**

1:29.31* Australia – Eindhoven 8-8-13
(Matt Abood, James Magnussen, Brittany Elmslie, Emma McKeon)

1:29.53 Russia – Herning 12-14-13
(Sergey Fesikov, Vladimir Morozov, Rozaliya Nasretdinova, Veronika Popova)

1:28.57 USA – Doha 12-6-14
(Josh Schneider, Matt Grevers, Madison Kennedy, Abbey Weitzeil)

AMERICAN RECORDS

LONG COURSE — WOMEN

800 METER FREESTYLE

8:11.00 Katie Ledecky – Shenandoah 6-22-14
8:07.39 Katie Ledecky – Kazan 8-8-15

1500 METER FREESTYLE

15:28.36 Katie Ledecky – Gold Coast 8-24-14
15:27.71p Katie Ledecky – Kazan 8-3-15
15:25.48 Katie Ledecky – Kazan 8-4-15

50 METER BACKSTROKE

27.68 Rachel Bootsma – Indianapolis 6-27-13
27.51 Natalie Coughlin – Santa Clara 6-19-15

LONG COURSE — MEN

50 METER FREESTYLE

21.40sf Cullen Jones – Rome 7-31-09
21.37sf Nathan Adrian – Kazan 8-7-15

1500 METER FREESTYLE

14:45.29 Larsen Jensen – Athens 8-21-04
14:41.20 Connor Jaeger – Kazan 8-9-15

50 METER BREASTSTROKE

26.86 Mark Gangloff – Rome 7-29-09
26.76sf Kevin Cordes – Kazan 8-4-15

SHORT COURSE METERS — WOMEN

100 METER INDIVIDUAL MEDLEY

58.65sf Ariana Kukors – Dubai 12-15-10
58.55 Natalie Coughlin – Viareggio 11-15-14

200 METER MEDLEY RELAY

1:49.71 Arizona – Indianapolis 3-17-00
(Beth Botsford, Amanda Beard, Amy Bouta, Denali Knapp)

1:46.82p USA – Doha 12-5-14
(Felicia Lee, Emma Reaney, Claire Donahue, Amanda Weir)

1:44.92 USA – Doha 12-5-14
(Felicia Lee, Emma Reaney, Claire Donahue, Natalie Coughlin)

200 METER FREESTYLE RELAY

1:37.27 Georgia – College Station 3-18-04
(Kara Lynn Joyce, Neka Mabry, Paige Kearns, Andrea Georoff)

1:34.61 USA – Doha 12-7-14
(Madison Kennedy, Abbey Weitzeil, Natalie Coughlin, Amy Bilquist)

400 METER FREESTYLE RELAY

3:28.46 USA – Atlanta 12-17-11
(Natalie Coughlin, Jessica Hardy, Dana Vollmer, Missy Franklin)

3:27.70 USA – Doha 12-5-14
(Natalie Coughlin, Abbey Weitzeil, Madison Kennedy, Shannon Vreeland)

SHORT COURSE METERS — MEN

200 METER MEDLEY RELAY

1:34.58 Texas – East Meadow 3-26-04
(Aaron Peirsol, Brendan Hansen, Ian Crocker, Garrett Weber-Gale)

1:33.25p USA – Doha 12-4-14
(Matt Grevers, Brad Craig, Tom Shields, Josh Schneider)

1:31.83 USA – Doha 12-4-14
(Eugene Godsoe, Cody Miller, Tom Shields, Josh Schneider)

200 METER FREESTYLE RELAY

1:25.69 Stanford – East Meadow 3-25-04
(Ben Wildman-Tobriner, Peter Marshall, Andrew Schnell, Bobby O'Bryan)

– continued on 32



Mireia Belmonte Garcia, Spain

[PHOTO BY JOAO MARC BOSCH]



Gregorio Paltrinieri, Italy

[PHOTO BY GIAN MATTIO DALBERTO/LAPRESSE]

RECORD PROGRESSIONS — cont'd from 31

1:25.55p	USA — Doha	12-6-14
	(Josh Schneider, Matt Grevers, Ryan Lochte, Darian Townsend)	
1:23.47	USA — Doha	12-6-14
	(Josh Schneider, Tom Shields, Jimmy Feigen, Ryan Lochte)	

**SHORT COURSE METERS — MIXED
200 METER FREESTYLE RELAY**

1:33.29	USA — Beijing	11-14-13
	(Anthony Ervin, Paul Powers, Katie McLaughlin, Kylie Stewart)	
1:28.57	USA — Doha	12-6-14
	(Josh Schneider, Matt Grevers, Madison Kennedy, Abbey Weitzeil)	

**SHORT COURSE YARDS — WOMEN
100 YARD FREESTYLE**

46.75r	Simone Manuel — Clearwater	3-29-14
46.29r	Abbey Weitzeil — Federal Way	12-13-14
46.09	Simone Manuel — Greensboro	3-21-15

200 YARD FREESTYLE

1:40.31	Missy Franklin — Minneapolis	3-21-14
1:39.10	Missy Franklin — Greensboro	3-20-15

500 YARD FREESTYLE

4:28.71	Katie Ledecky — Germantown	2-7-14
4:26.58p	Katie Ledecky — Boyds	2-6-15

1650 YARD FREESTYLE

15:15.17	Katie Ledecky — Knoxville	12-7-13
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15:13.30	Katie Ledecky — Greensboro	12-6-14
50.01	Natalie Coughlin — Austin	3-22-02
49.89p	Kelsi Worrell — Greensboro	3-20-15
49.81	Kelsi Worrell — Greensboro	3-20-15

400 YARD MEDLEY RELAY

3:27.51	Stanford — Minneapolis	3-20-14
	(Maya DiRado, Katie Olsen, Felicia Lee, Lia Neal)	
3:26.41	Stanford — Greensboro	3-19-15
	(Ally Howe, Katie Olsen, Janet Hu, Simone Manuel)	

400 YARD FREESTYLE RELAY

3:09.40	Arizona — Indianapolis	3-23-13
	(Megan Lafferty, Margo Geer, Kait Flederbach, Monica Drake)	
3:08.54	Stanford — Greensboro	3-21-15
	(Lia Neal, Janet Hu, Lindsey Engel, Simone Manuel)	

800 YARD FREESTYLE RELAY

6:52.64	Georgia — College Station	2-19-13
	(Shannon Vreeland, Megan Romano, Jordan Mattern, Allison Schmitt)	
6:50.18	California — Federal Way	2-25-15
	(Cierra Runge, Elizabeth Pelton, Caroline Piehl, Missy Franklin)	

**SHORT COURSE YARDS — MEN
1650 YARD FREESTYLE**

14:24.35	Chad La Tourette — Federal Way	3-22-12
14:23.52	Connor Jaeger — Greensboro	12-6-14
1:36.81	Ryan Lochte — Daytona Beach	12-1-07
1:36.77	Ryan Murphy — Iowa City	3-28-15
1:39.65	Michael Phelps — Annapolis	3-7-10
1:39.65t	Tom Shields — Indianapolis	3-30-13
1:39.31tt	Jack Conger — Austin	2-25-15

200 YARD INDIVIDUAL MEDLEY

1:40.08	Ryan Lochte — Atlanta	11-29-07
1:40.07	David Nolan — Federal Way	3-5-15
1:39.38	David Nolan — Iowa City	3-26-15

200 YARD MEDLEY RELAY

1:22.83	California — Austin	3-28-14
	(Ryan Murphy, Chuck Katis, Tony Cox, Tyler Messerschmidt)	
1:22.40p	California — Iowa City	3-27-15
	(Ryan Murphy, Chuck Katis, Justin Lynch, Tyler Messerschmidt)	

400 METER MEDLEY RELAY

3:01.91	Stanford — College Station	3-26-09
	(Eugene Godsoe, Paul Kornfeld, Austin Staab, Alex Coville)	
3:01.60	California — Iowa City	3-26-15
	(Ryan Murphy, Chuck Katis, Justin Lynch, Seth Stubblefield) ❖	

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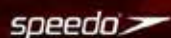
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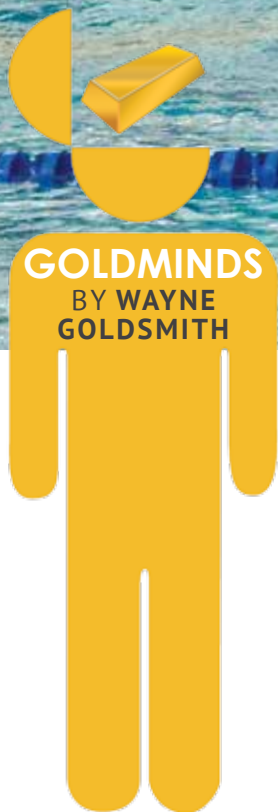
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HOW MUCH IS ENOUGH?

The training load for young swimmers and the high time commitment required to be involved in competitive swimming are critically important issues both to the athletes and their parents.

Here's the \$10 million question: "What's the appropriate swimming training load for young swimmers?"

The short answer is... "No one really knows."

There's strong debate in the swimming coaching and sports science community about this question, and there are plenty of gurus who will claim they have *the only* answer.

However there is no *only* answer. There's no-magic-no-infallible-totally-irrefutable-set-in-concrete-training-load formula that applies to all swimmers of all ages, both genders and every level of experience. Period!

Therefore...*Why do swimmers and coaches—working in a sport that is ostensibly sprint-based (i.e., more than 80 percent of all swimming events are 200 meters or less)—do so much hard work?*

1. The past. It's the way it's been done all over the world for the past 50 years or so.

2. The greats. The coaches of some of the greatest swimmers the world has ever seen—for the most part—are coaches who

"Ultimately, the solution lies in the answer to this one simple question: 'What's the best training load for each individual swimmer to help them realize their swimming potential?' A swimmer-first approach is always going to be the right one."



[PHOTO BY ANDREA NIGH]

subscribe to high volume/high yardage/big miles training philosophies.

3. Science. A lot of the early scientific research done on the physiology of swimming was focused on the development of aerobic capacity and endurance, and the concept of "aerobic-base" became one of the most important concepts in swimming coaching.

4. Because they can. Because swimming is a body-weight-supported exercise

and involves little or no "eccentric" muscle loading, swimmers can do a relatively large volume of training with limited injury risk (providing they also do the appropriate flexibility, mobility and stability training and swim with correct technique).

However, as it is in all industries and in all walks of endeavor, the past is the past. Things change. Things evolve. And things get better.



[PHOTO BY DAVI-ELLEN CHABNER]

Swimming isn't any different.

Why is this question more important now than it has ever been in the history of competitive swimming?

There are five reasons:

1. The "NutriBullet" reason
2. The "Scientific" reason
3. The "T-25" reason
4. The "Burnout" reason
5. The "Economic" reason

THE "NUTRIBULLET" REASON

Television advertising for the "NutriBullet" runs 24 hours a day all over the world. It's well-marketed, well-promoted and probably well-designed, but let's face it—it's a *blender*. Behind all the colors and testimonials and promises of better health, weight loss and superior nutrition...it's still a blender—a common household appliance that's been with us in various forms for 50 years.

So why is it selling so well around the world? And how has it made millionaires of the company owners?

Because of the way it's marketed.

Listen to the advertising: "It's *not* a blender. It's a turbo-charged, precision-engineered, high-quality futuristic appliance that unleashes the molecular energy of food at a sub-atomic level."

Let's apply "NutriBullet" thinking to swimming—and to sports in general.

Football, basketball, baseball, hockey, extreme sports, triathlon—many high-profile sports spend millions of dollars marketing their "product" the "NutriBullet" way.

Imagine for a moment that every sport available to parents looking for a sporting option for their children was lined up side by side.

What would they see?

Football: high-profile stars, incredible opportunity for wealth, success, college education, television and celebrity.

Games are fast and entertaining, training commitments relatively short, and it's a wonderful spectator sport.

Basketball: high-profile stars, incredible opportunity for wealth, success, college education, television and celebrity.

Games are fast and entertaining, training commitments relatively short, and it's a wonderful spectator sport.

Swimming: ten years of hard work up and down a pool, little or no chance of making any money from it and—except for a few superstars—no fame, glory or celebrity.

Swim meets are generally long, boring and slow, training commitments are usually between 12 to 24 hours per week, and with the exception of national championships and some high-profile college meets, it's about as entertaining to spectators as a grass-growing competition.

The swimmers are awarded the same ribbons and medals at 16 years of age as they were at 6 years of age...and often they have to sit in the stands for hours between races, watching seemingly endless heats of 50-meter events for 8-, 9- and 10-year olds.

Let's face it. We do a lousy job selling swimming compared to many other sports... and in the end, we are trying to reach the same kids and parents that football, basketball, baseball and hockey are trying to reach.

THE SCIENTIFIC REASON

In recent years, the sports science community and the mainstream media have published numerous articles on how it's

possible to gain significant improvement in endurance with reduced training volume.

Articles and research have challenged traditional views of "aerobic-base" training and the historical commitment of coaches and athletes to extended periods of hard endurance training.

Consider such articles as:

- "The Effects of 12 Weeks High-Intensity & Reduced-Volume Training in Elite Athletes"

"With swimming, you have 10 years of hard work up and down a pool, little or no chance of making any money from it, and—except for a few superstars—no fame, glory or celebrity."
(Pictured: Missy Franklin at 2014 Pan Pacs)



[PHOTO BY DELLY CARR]

- "Low- and High-Volume of Intensive Endurance Training Significantly Improves Maximal Oxygen Uptake after 10 Weeks of Training in Healthy Men"

...or research into "polarized" training that claims:

- "Polarized training has greater impact on key endurance variables than threshold, high-intensity or high-volume training."

This kind of research has challenged traditional views of "aerobic-base" training and the historical commitment of coaches and athletes to extended periods of hard endurance training.

— continued on 38

The bottom line is that there are new and better ways of training athletes, and swimming coaches need to carefully, intelligently and systematically evaluate how these new training techniques and methods can help them coach more efficiently and effectively.

THE "T-25" REASON

Turn on the television and see what's on the different channels. Every other channel seems to be either an infomercial about a new diet and weight-loss product or someone trying to sell fitness training equipment or the latest revolutionary new exercise program.

"T-25" is a great example. They promise outstanding results with a training commitment of only 25 minutes per day.

And they are not the only ones: there are hundreds of similar companies promoting "combat" training, "warrior" training, boxing-type training, High-Intensity Interval Training, "Cross-fit" and many, many other time-efficient, highly effective training routines offering "more for less"—i.e., better results in less time.

By comparison, swimming—for the most part—is still "married" to the traditional model for commitment to the development of fitness, speed, endurance and power: two sessions per day, eight to 10 sessions per week, 45 to 48 weeks per year.

Increasingly, new "clients"—people new to the sport of swimming—are openly questioning coaches about the need to do so much training when other experts in other sports and other sectors of the fitness industry are offering great results in much less time.

THE BURNOUT REASON

There is a lot of concern in junior sport about the issue of "burnout."

In swimming, "burnout" refers to the

worldwide phenomenon in which teenage swimmers—who were overexposed to excessive training loads at a young age—become exhausted mentally and physically. They either decrease their commitment to swimming or drop out of the sport completely.

Since most swimmers do not hit their performance peak until their late teens or early 20s, the practice of swimmers leaving the sport in their mid-teens has a significant impact—particularly on the elite end of the sport.

THE ECONOMIC REASON

In many countries, competitive swimming is in trouble.

Swimming—as a sport, as a fitness activity, as a health-and-fitness option—has never been in better shape. However, the *competitive* side of the sport is in decline in many parts of the world.

In Australia, for example, the number of actual registered competitive swimmers has plummeted significantly over the past 15 years.

Other swimming nations in Africa, Europe, South America and Asia have all experienced similar large decreases in the number of swimmers who choose to train and race.

In response to these declines, swimming organizations have tried to market the sport more aggressively. They have introduced different junior "encouragement"-type programs, tried to tap into the school system for new clients and have attempted to link the large and lucrative learn-to-swim market into the competitive swimming area.

In reality, none of these programs have made any real impact on competitive swimming numbers.

However, increasingly, the swimming administrations of these countries are looking at the actual "product": what the coaches are offering as "swimming" to "consum-

ers" (i.e., swimmers and parents).

In recent years, several swimming nations, including Australia, Great Britain and the United States, have spent a lot of money, time and energy on broad reviews of swimming, and have specifically investigated the needs of "consumers."

Not surprisingly, these reviews have revealed that the training load and the high time commitment required to be involved in competitive swimming are critically important issues to both swimmers and parents.

WHAT'S NEXT?

Regardless of the reason or rationale, this debate will continue—possibly forever.

However, coaches, swimmers and even swimming administrators need to think carefully and intelligently about this topic as the scope of the debate spreads across all areas of the swimming industry.

Ultimately, the solution lies in the answer to this one simple question: *What's the best training load for each individual swimmer to help them realize their swimming potential?*

A swimmer-first approach is *always* going to be the right one.

As many industries are learning, the key to success is designing products and services that are specifically matched to the needs of the consumers.

Even McDonalds is now offering a "make your own burger" as they realize that their sustainable success will depend on their ability to adapt to the needs of individuals rather than to offer the same product list to everyone—everywhere—every day.

If we, as an industry, focus on what's right for each individual swimmer and not be "married" to the training models of the past, the overall impact on the industry will be strongly positive. In addition, the sustainable success of the sport of swimming around the world will be assured. ❖

SUMMARY

1. The question—"What's the best training load for a young swimmer?"—will be debated as long as there's swimming pools and people wanting to train to swim fast.

2. As it is with all things: if it works—it works. For some swimmers, success with a relatively small training load is possible. For others, success only comes from working hard—consistently and deliberately over many years.

3. The crucial issue is not "how much training"—i.e., training volume—a swimmer does; it's how they complete that volume. Other variables such as training intensity, recovery, types of training, use of training equipment and the overall, total physical training load of the swimmer (e.g., across other sports and other fitness activities in addition to pool training) need to be taken into consideration when

determining the "optimal" training load for individual swimmers.

4. In every industry, the ongoing search for continuous improvement drives change, increased efficiency and enhanced performance. Swimming isn't any different: what "was" is no indication of "what can be."

5. Coaches looking to experiment with significant changes to their coaching philosophy—as it applies to training load—should do so thoughtfully, deliberately and strategically. They should not change on a whim—perhaps in response to demands from swimming parents or because a "guru" is promising better results in less time. Think carefully about what you believe in, commit to it with everything you have—and the results will follow.

Wayne Goldsmith is one of the world's leading experts in elite-level swimming and high-performance sport. Be sure to check out Goldsmith's websites at www.wgaquatics.com and www.wgcoaching.com.



SWIMBOT
BETTER ON TECHNIQUE

Combining Polarized Training and SWIMBOT: Nicolas Granger's New Idea

What is polarized training?

The traditional training method called "threshold training" has been used for years in swimming clubs. The principle is to regularly swim sets that last 30 to 45 minutes at the best average speed with short rest. Scientific studies in the 1980s reported that training at these moderate speeds was ideal for developing endurance.

As opposed to this method, polarized training is now seeing the light of day in many clubs. Polarized training consists of training at low intensities around 80% of the time. The remaining 20% consists of high intensity interval training (HIIT) or competitions and small amounts of threshold work. Most research findings have shown that polarized training is superior for developing both central endurance (cardiovascular adaptations) and peripheral endurance (local muscular endurance).

Swimbot has met Nicolas Granger, one of *Swimming World Magazine's* "World Masters Swimmers of the Year" in 2013, 2014 and 2015. He explains to us how instinctively throughout his swimming career he shifted from threshold training to polarized training and why this is the best method for him:

Why are you interested in polarized training?

"For many reasons! I am no longer 20 years old, and I don't feel capable (either physically or mentally) of doing the high-yardage, threshold-type training I used to do when I was younger. So instinctively through trial and error, I have found with time that training at very slow speeds—with lower yardage, but with extremely high demands on the technical aspects of my stroke—has yielded better results. High-intensity training only

represents a small amount of my training volume, either as competitions or occasionally as HIIT sets such as 6 x 150 at a fast pace. It is also important to me to include regenerative weeks of training to improve recovery and adaptation. This enables me to maintain a high quality technique all year round and to perform at the important competitions.

"As I am my own coach, I've been able to explore alternative methods, and for me, training based only on physiological development is a mistake. I have learned a lot from other sports such as Alpine skiing, where visualization is a key part of training. Alpine skiers incorporate specific breathing patterns to their visualization routines. Mastering breathing is a big part of my focus during my training and I feel that when breathing is efficient, the rest of the stroke is as well. This is especially important for optimizing my technique in the individual medley, where you change strokes all the time."

What are the limits of polarized training?

Studies on swimming efficiency show that the best compromise between distance per stroke and stroke rate generally occurs around threshold pace. This sheds serious doubt as to whether polarized training is adaptable to swimming!"

At very slow speeds, there is the danger of overgliding, which, in freestyle, takes the form of "catch-up stroke." Important intra-cycle speed variations are simply incompatible with efficient racing. Also, most swimmers find slow swimming boring! Efficient slow swimming requires the presence of a great coach who has time for you or a lot of experience and focus, which is the case of Nicolas Granger!

Alternatively, swimming at very high speeds often pushes swimmers to have poor technique. Drag increases exponentially with speed, and most swimmers have a tendency to greatly increase stroke rate without being efficient. Fatigue also causes distance per stroke to shorten. So, efficient swimming at high speeds also requires focus, experience and the eye of a great coach!

Thus, there exists a serious dilemma in swimming: traditional "threshold" training seems to provide more benefits in terms of biomechanical efficiency, whereas polarized training provides greater physiological benefits.

Polarized training and Swimbot

SWIMBOT may be the answer to this dilemma. At slow speeds, it is able to give instant feedback on changes in speed within the stroke cycle. It also helps swimmers to optimize breathing patterns with its sophisticated tempo cues. At high speeds, it gives instantaneous feedback on streamlining as well as data on stroke rate and distance per stroke. It's now possible for each swimmer to have full-time technique feedback whatever the pace.

"I think Swimbot will be a game changer as I train on my own: it will be possible to get feedbacks!" says Nicolas Granger. "High technology within the smart device is so impressive that it will avoid wrong interpretations and mistakes. SWIMBOT will help me as a coach to train my swimmers who need instantaneous feedbacks, as I can't give them all at the same time, and I can't see what happens underwater."

More information is available on www.swimbot.net and www.facebook.com/swimbot

NEW YEAR, NEW STRENGTH:

4 Simple Exercises to a Stronger 2016

BY J.R. ROSANIA

PHOTOS BY EMMI BRYTOWSKI

DEMONSTRATED BY

CARL MICKELSON AND SUSIE PAUL

Did you know that after the age of 30, we lose one percent of our strength per year? So, do the math: if you're 50, that's 20 percent; at 60, that's 30 percent. Well, you get the picture.

As we lose strength, our performance is affected. We become more injury-prone, and our body composition changes as we lose lean muscle and gain body fat. This all affects our swimming and our lifestyle.

The obvious question is: "What can we do about it?" And the answer is: "STRENGTH TRAIN!"

This article offers four great simple strength exercises that, if done two to three times a week, will slow down the process of muscle and strength loss. All you will need are two light dumbbells (five to 15 pounds) and some stroke tubes with handles.

Perform the routine two to three times a week by doing 12 to 15 reps per exercise and two to three sets. Try to do the routine every other day, and avoid doing the exercises on consecutive days.

Have fun...and become a stronger you! ❖

MEET THE TRAINER

J.R. Rosania, B.S., exercise science, is one of the nation's top performance enhancement coaches. He is the owner and CEO of Healthplex, LLC, in Phoenix.

Check out Rosania's website at www.jrhealthplex.net.



MEET THE ATHLETES

Carl Mickelson swam for the University of Arizona. As a senior, he finished fourth in the 100 and 200 yard breaststroke at the 2012 NCAA Division I Championships.

Susie Paul has been a Masters swimmer for the past 10 years.

NOTICE

All swimming and dryland training instruction should be performed under the supervision of a qualified coach or instructor, and in circumstances that ensure the safety of the participants.

1 HAMMER CURLS

Holding a dumbbell in each hand, lift one dumbbell like hammering a nail. Alternate arms and repeat.



2 DUMBBELL KICKBACKS

Holding the dumbbells together and by your side, slightly bend over to almost parallel to the floor. Fully extend one arm back, then alternate arms.



3 TUBE UPRIGHT ROW

While standing on the center line of a stroke tube to give it tension—and holding both handles—raise both elbows in an upward motion. Lower and repeat.



4 DUMBBELL PUSH-UP AND ONE-ARM ROW

Get into a push-up position with hands on the dumbbells. (If necessary, you can be on your knees.) Begin by performing a full push-up. Then perform a dumbbell row with one arm. Alternate with the other arm, then repeat, beginning with the push-up.



SUSAN TEETER

BY MICHAEL J. STOTT

Princeton's Susan Teeter has leveraged insights from some of the sport's best minds to craft a coaching style that has produced a swimming powerhouse and proud legacy among alumni, family and friends.

Q. SWIMMING WORLD: *Mentors?*

A. COACH SUSAN TEETER: I've been fortunate to have many. In college, I worked as many swim camps as I could. Texas Swim Camp in 1980 had a profound influence on my thinking. Eddie Reese was such an amazing technical coach that I immediately wanted to emulate his expertise. Karen Moe-Thornton (now Humphries), the head coach at Cal, was instrumental. My love for team building and team chemistry came from Kathie Wickstrand-Gahen, coach at Northwestern and currently president of the International Coaching Society and an assistant with Teri McKeever.

SW: *What makes mentoring so important to you as head coach?*

ST: I love connecting, helping others, paying it forward and taking care of people. I'm a pretty A.D.D. person with a lot of energy so I can get a lot done in a day. I'm always looking for the next project I can help someone complete.

SW: *Where does the Alyson Goodner experience rank in your mentoring relationship with athletes?*

ST: This was very special. It's not every day someone asks you to perform their marriage ceremony. Alyson's Princeton Class of 2000 stole my heart from Day One and remains that way now. I am still in contact with that class and am grateful for their friendship. Alyson's parents were my good friends. When they passed away prior to her meeting and marrying Paul Daniels, it made it all the more special to support her as she entered a new phase of her life. Without a doubt, a "Top 3 Moment" in my career!

SW: *What was it about your assistants (i.e., Greg Meehan, Phil Spiniello and Suzanne Yee) that prepared them for other coaching responsibilities?*

ST: All of them truly understood that coaching is not just coaching. It's the paperwork, the planning, taking care of sick athletes, ordering food and equipment, continually learning from others and all of the little things that happen behind the scenes before you actually coach. Their personalities and competitiveness matched mine. As a result, we worked well together. They were willing to learn and let me push them to do things that were outside their skill sets. I encouraged them to be better people for themselves so they could be better coaches for others.

Suzanne, who was named associate head coach in October, came to Princeton with more experience than Greg and Phil, and it's been easy to turn her loose and let her be the extraordinary coach she is. That was one reason I let her take over Lisa Boyce's training and help Lisa become an All-American.

I'm proud of all three coaches for what they have achieved, and I'm honored if I was some small part of it.

Editor's Note: Meehan, a Princeton assistant women's coach from 1999-2001, was hired as head women's swimming coach at Stanford in 2012 after coaching stints at UCLA, Pacific (head coach) and Cal. Spiniello, a Princeton assistant women's coach from 2006-10, was the head women's coach at Rutgers from 2010-15 before being hired as an assistant coach last May at the University of North Carolina.

SW: *You have a reputation for being terribly creative.*

ST: I have always been a "big picture" person who sees the end product and how to make something happen, then go backwards to figure out how to do it. I get some crazy ideas, dress in some crazy clothes and dream up some ridiculous ideas. I'm sure my team has rolled their

[PHOTO PROVIDED BY PRINCETON ATHLETIC COMMUNICATIONS]



Coach Susan Teeter

Head Coach

Women's Swimming and Diving
Princeton University, Princeton, NJ

- University of Tennessee, B.F.A., '81
- Former women's assistant at Tennessee and men's and women's assistant at Auburn
- Coached Princeton to 17 Ivy League Championships
- Career record in 32 years at Princeton is 213-54-1
- Served on the staff of nine international teams, including assistant manager of the 2000 U.S. Olympic team and head manager in 1996
- CSCAA Lifetime Achievement Award, 2011; ASCA Award of Excellence four straight years, 2006-09

Susan Teeter has trained athletes who have become U.S. senior national qualifiers, Ivy League champions and team members for the World University Games and Olympics. Her most decorated athlete was Alicia Aemiseggar, Class of 2010, a 13-time All-American who won 12 Ivy League titles. Teeter is a Certified Professional Behavioral Analyst as well as a Certified Professional Values Analyst and CSCAA president-elect.

— continued on 43

HOW THEY TRAIN: LISA BOYCE AND CLAIRE McILMAIL

BY MICHAEL J. STOTT

[PHOTO PROVIDED BY PRINCETON ATHLETIC COMMUNICATIONS]



LISA BOYCE

For Lisa Boyce—two-time Princeton All-American, seven-time school record holder and Ivy League Female Swimmer of the Meet (2014)—the beat goes on as she now trains at Longhorn Aquatics in Austin, Texas in her quest to make the USA Olympic team.

Boyce, from Champaign, Ill., entered Princeton in the 2010-11 season at age 16, and blossomed under the tutelage of Coach Susan Teeter and especially assistant Suzanne Yee. She earned A-A status in the 100 yard fly as a senior (51.66, seventh at NCAAs, 2014) and 100 free as a junior (48.37, 15th, 2013).

“Her growth as an athlete was due both to her maturation and

intense training focus,” says Yee. “Lisa was fortunate to come into the stroke/sprint group and have (upperclassman) Megan Waters (former school record holder in the 50 and 100 free, 100 fly) to train with and as a training mentor for two years. The two would stay after every workout to work on perfecting ‘little things’—especially starts, turns, underwater and breakouts. Lisa adopted Megan’s mentality and continued to mentor the women in the classes below her,” she says.

Boyce typically trained in the middle distance/stroke group, but on quality/race days and before bigger meets, she did more classic sprint workouts.

“When working through a plan for Lisa, we looked at her strengths and weaknesses, and really worked on both,” comments Yee. “One of her weaknesses was aerobic fitness, which is why she continued to train with a more aerobic base in the middle/stroke group as well as doing additional cardio work outside of the pool. The other was lack of upper body strength. Consequently, she became one of the hardest workers in the weight room.

“Lisa’s greatest strength was and is her natural ability underwater. We worked on the angle and amplitude of her kicks as well as the count and leg strategy for her races,” says Yee. “Going 22.0 (50 free), Lisa was 15 meters underwater both directions. Going 48.3 (100 free), she was 15 meters on the last wall after cutting a few kicks off on her 50 wall.

“Her school record 51.57 100 fly (prelims at 2014 NCAAs) was swum pretty much 60 meters underwater. She was able to verbalize how she felt in the water better than most athletes I have coached, which led to her continued improvement.

“Our sprint program combines the ability to train women to have the aerobic capacity to finish races—including 200s—and be able to come off of the rest phase and have fast 50s,” says Yee.

“Looking back I attribute my successful training to the extremely open lines of communication with both coaches and training flexibility. We were constantly adapting our plan based on the previous season, working on continual progression of my strengths while addressing and minimizing my weaknesses. Consequently, each year was vastly different, which kept things fresh and interesting for all four years.

Boyce on training at Princeton:

“Teeter taught me the discipline required for good underwaters. During one practice my junior year, she told me to kick all the way to 15 meters off the last wall of every fast repeat we were doing—even if I thought it would slow me down. Through this rehearsal, I learned that no matter how tired I was, I could commit to staying under to 15 meters off that last wall, which gave me a lot more confidence in my ability to finish my races.

“Suzanne worked with me on ideal strategies for every race, specifically determining the number of kicks and appropriate breathing patterns that would allow me to finish with the 15-meter breakout.

“One of the best lessons I learned was taking full responsibility for my own training. The coaches were there to guide me and provide the best possible pathways to personal improvement, but the ultimate responsibility was always my own. I wouldn’t be where I am today as a swimmer, a teammate or a person without their constant guidance and support both in and out of the water.”

PROGRESSION OF TIMES - LISA BOYCE

SCY	HS	Fr	So	Jr	Sr*
50 Free	23.41	22.83	22.45	22.07	22.29
100 Free	50.65	49.69	49.13	48.37	48.91
100 Back	55.16	54.19	52.96	52.93	52.85
100 Fly	57.00	56.07*	54.08*	53.95*	51.57**

* = Unrested ** = NCAAs

[PHOTO PROVIDED BY BEVERLY SCHAEFER/ PRINCETON ATHLETIC COMMUNICATIONS]



[PHOTO PROVIDED BY BEVERLY SCHAEFER/
PRINCETON ATHLETIC COMMUNICATIONS]

eyes more than once, but they love it in the end—and that’s all that counts.

SW: *Traditionally, you carry a large roster.*

ST: We love having a big team. I want someone with Olympic Trials cuts training next to someone who might never score a point because that might be the one person that pushes them to be her best. If nonscoreing/nontraveling kids want to stay on your team, then you know you’ve created an environment that people want to be in. To me, that’s coaching.

SW: *What’s a normal weekly practice schedule—in water and dryland?*

ST: We lift three times per week on Monday and Wednesday mornings and Thursday afternoons. We swim after we lift, have a two-hour workout in the afternoons Monday through Thursday plus two hours on Friday and Saturday mornings. We have team meetings on Friday afternoons with all of the swimmers and divers. We add a yoga series on Saturdays after the morning swim to work core and stretch out after the week of work.

SW: *How do you handle conflicts with classes?*

ST: Princeton believes there should be time blocks when there are no classes and when students can be athletes, musicians, artists, actors, members of student government or whatever moves them. Consequently, we don’t have any afternoon conflicts. Our classes don’t start until 9 a.m., so we don’t have any conflicts there either.

SW: *How has the work you do with the team outside of the pool contributed to your continued success at the conference and national level?*

ST: Working with our athletes outside the pool has been critical for our sustained success. We do a tremendous amount of team building to teach them life skills that make them better people, teammates, communicators and, ultimately, better swimmers and divers. My work outside of Princeton with the national and Olympic teams has made me a better coach and has allowed me to give back to the sport of swimming at the highest levels.

– continued on 44

[PHOTO PROVIDED BY PRINCETON
ATHLETIC COMMUNICATIONS]

CLAIRE McILMAIL

A three-star CSCAA recruit, McIlmail finished her freshman year as 2015 Ivy League champion in the 200 yard free (1:47.21). She also turned in top Tiger times in the 100 and 500 free (49.94, 4:50.11) and third best in the 200 fly (2:01.09).

“Claire McIlmail is a great example of how we try to integrate an individual into a group environment,” says Teeter. “Doing so allows us to keep the team intact and teach athletes how to take care of themselves within that structure.

“Claire came to us with bad shoulders and a recent history of inconsistent training. We threw some fins on her, tweaked her stroke from a bent arm to a straight-arm recovery, taught her tempo and trained her within the same workout. The team understood that Claire had to train that way to survive and contribute. Once Claire realized she could actually train again and compete, we had ourselves a believer.

“By December at the Brown Invitational, Claire was swimming at or better than lifetime best swims. We then added sprint work to her program twice a week so she could get out in a race. When she let go of

her fears and went after it, she showed just what a great racer, trainer and teammate she was,” says Teeter.

McIlmail on training at Princeton:

“I used to think that an injury was an obstacle that would hold me back from competing at 100 percent. With previous injuries, I would respond by pushing through the pain. Teeter helped me change my mindset. She taught me that an injury is a learning experience and might require another training path. I realized I had to train a little differently, and I worked on developing a powerful kick.” ❖

PROGRESSION OF TIMES - CLAIRE McILMAIL

SCY	HS Jr	HS Sr	Fr
100 Free	50.81	50.55	49.94
200 Free	1:48.72	1:49.43	1:47.21
500 Free	4:48.79	4:54.86	4:50.82

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For more information/application, check our employment section at www.LonghornswimCamp.com. Completed applications accepted until positions filled.

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If you fail to prepare, you're prepared to fail. - Mark Spitz



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Q&A — continued from 43

SW: Without a “traditional” budget, you rely on your swimming and diving alumni base for a lot of the expenses. How have you helped cultivate that relationship?

ST: Having been at Princeton now 32 years, I have had the honor of coaching most of the women who have swum here with the exception of the classes from 1974-84. We have an incredibly loyal and giving alumni group. It’s something cultivated across the entire university while a student is here.

Our parents are our greatest cheerleaders. I appreciate anyone who’ll pay and sacrifice what these folks do to have their kids at Princeton versus just accepting a scholarship elsewhere. I consider myself lucky to call a good deal of these parents some of my best friends.

SW: You have had several amazing senior classes from a leadership perspective?

ST: I think my connection with the Class of 2000 rarely goes unnoticed. These women endowed an award named after me prior to them even graduating. It’s one of the only times in my life that I was speechless! I have had some amazing senior classes throughout my time here—too many to name and rank!

SW: What is your favorite piece of tiger print paraphernalia?

ST: Many good assistants have made me “weed out” my tiger collection over the years. This past year, we got new office furniture, and Suzanne wouldn’t allow me to put anything back in unless I could justify it.

The tigers in my office and home are innumerable. One of the favorites is a piece of tiger-striped cloth/material that someone brought to the pool back in the Dillon (old pool) days. That would make it 25-plus years old, and its name is “Woobie” after the movie, *Mr. Mom*—yes, this dates me! I carry it like a security blanket, and wave it at distance swimmers throughout their races. I’m fairly sure my colleagues hate it! ❖

Michael J. Stott is an ASCA Level 5 coach whose Collegiate School (Richmond, Va.) teams have won eight state high school championships.

UP & COMERS

AGE GROUP SWIMMER OF THE MONTH

BY TAYLOR BRIEN

KATE DOUGLASS

Kate Douglass, 13, of Westchester Aquatic Club (N.Y.) was one of the youngest athletes to compete at the Minneapolis stop of the Arena Pro Swim Series last November.

Seeded sixth in the “C” final of the 200 meter breast, Douglass—who turned 14 later in the month—won in 2:31.37, a time nearly 3-1/2 seconds faster than what she clocked the previous January (2:34.71) for her first Olympic Trials cut. She also owns an OT qualifying time in the 50 free (25.80) from juniors in August—the fastest American time ever in the event by a 13-year-old girl.

Head coach Carleanne Fierro believes that Douglass “has an ability to change gears and increase her speed in the water, kicking it in gear at the end of the race to finish fast.”

In her first high school season this past fall, Douglass earned automatic All-America times in the 50 and 100 yard free as well as the 100 breast. At the NYS Public High School and Federation Championships in November, she helped her Pelham High Pelicans to a second-place finish with four medals and a win in the 100 free (50.32).

Coach Fierro also notes that her young star “is very humble and grounded—she is really just a normal kid who doesn’t obsess about swimming.”

Douglass is the oldest of three kids, but the only swimmer in the family. Her sister and brother both play soccer. ❖

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PICTURED > Kate Douglass (left) with Missy Franklin

WHAT IS THE BEST THING YOU DO IN SWIMMING?

I think I'm a good "back-half" swimmer—I like to save my energy and sprint the last lap of a race.

WHAT ARE SOME OF THE TOUGHEST SETS YOU'VE DONE?

Since we focus a lot on technique, a distance freestyle set is always a challenge to me.

WHAT IS YOUR FAVORITE THING ABOUT SWIMMING?

I have a lot of friends from summer swimming, club swimming and varsity swimming, and it's really fun when they all overlap. Travel meets—like high school states, when you get to stay with your friends in a hotel—are the best.

WHAT ARE YOU MOST LOOKING FORWARD TO THIS YEAR?

I'm really excited about Olympic Trials. I'd like to make at least one more qualifying time before then. I remember watching the Trials in 2012, and it looked really exciting.

WHO IS YOUR SWIMMING IDOL...AND WHY?

I recently got to meet Missy Franklin in Minneapolis—she was so nice and approachable. It was great to watch her race in person.

WHAT ARE YOUR FAVORITE HOBBIES?

When I'm not swimming, I like to bake and shop with my friends.



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2015 GOLDEN GOGGLES

STORY AND PHOTOS BY ANNIE GREVERS

This year's 12th annual USA Swimming Foundation's Golden Goggles awards banquet, Nov. 22, honored the 2015 World Championship team. We're used to seeing these faces light up the pool, but this time, they illuminated the red carpet.



1

2015 GOLDEN GOGGLES AWARD WINNERS

Female Athlete of the Year:
Katie Ledecky

Male Athlete of the Year:
Michael Phelps

Perseverance Award:
Allison Schmitt

Female Race of the Year:
Katie Ledecky's 200 free at World
Championships

Male Race of the Year:
Jordan Wilimovsky's 10K at World
Championships

Relay Performance of the Year:
4 x 200 FR at World Championships
(Missy Franklin, Leah Smith, Katie
McLaughlin, Katie Ledecky)

Breakout Performer of the Year:
Jordan Wilimovsky

Coach of the Year:
Bruce Gemmell,
Nation's Capital Swim Club



2



1 Andra Day, soul/R&B singer who is “about to blow up” (as Anders Holm put it), gave a goosebump-raising concert during the awards intermission.

2 (From left) Katie Ledecky, Katie McLaughlin, Leah Smith and Missy Franklin pose after winning their Relay of the Year Golden Goggles for the 4 x 200 free relay at World Championships.

3 (From left) Nicole Johnson (cradling Baby Phelps Bump), Michael Phelps and Allison Schmitt are naturals on the red carpet. Phelps took home Male Athlete of the Year honors,

and Schmitt won the Perseverance Award. Schmitt gave a moving speech on raising awareness about mental health, especially depression, often concealed in sport.

4 Stanford stars (from left) Lia Neal and Felicia Lee sport their winter whites. Who wore it best? A tie? We agree.

5 2016 open water Olympian, Haley Anderson, dazzled in a two-piece on the red carpet.

6 Anthony Ervin—no newbie to this elite swimmers scene—took a bow for the red carpet audience.

7 SwimMAC power couple: breaststroker Katie Meili (nominated for Breakout Performer of the Year) with fast flyer, Tim Phillips.

8 Katie Ledecky took to the stage three times at the Golden Goggles, winning Race of the Year (200 free at World Championships), Relay of the Year (4 x 200 free relay at World Championships with Missy Franklin, Leah Smith and Katie McLaughlin) and Female Athlete of the Year.

9 Olympic veterans Elizabeth Beisel and Ryan Lochte do their best James Bond impression on the red carpet. ❖

PARTING SHOT



Two-time Olympian Katie Hoff announced her retirement from swimming, Dec. 14, due to blood clots in her lungs. Her stellar career included an Olympic silver medal in the women's 400 meter freestyle in 2008 at Beijing, where she also captured bronze medals in the 400 IM and 800 free relay. At the long course World Championships in 2005, 2007 and 2011, she won seven gold medals.

The 26-year-old wrote on her social media, "I have a lot to be thankful for over the course of my career, it was a dream come true in so many ways. The opportunity to travel the world and represent Team USA at the Olympics and World Championships was truly an honor for me."

Check out more details online—as well as a photo gallery of Katie's career—at SwimmingWorldMagazine.com:
<http://www.swimmingworldmagazine.com/news/3-time-olympic-medalist-katie-hoff-announces-official-retirement/>

[PHOTO BY ANDREA NIGH]