Mentoring as a Player Coach
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The Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Award is given by the American Physiological Society in honor of an inspirational mentor and scientist, Dr. Bodil Schmidt-Nielsen. This award is given to honor a member of the American Physiological Society who is judged to have made outstanding contributions to physiological research and demonstrated dedication and commitment to excellence in training of young physiologists whether by mentoring, guiding and nurturing their professional and personal development, developing novel education methods/materials, promoting scientific outreach efforts, attracting individuals to the field of physiology, or by otherwise fostering an environment exceptionally conducive to education in physiology. Being selected for this award is both a blessing and a humbling experience. I am grateful to receive this recognition based on the evaluation of my scholarship and the opinions of those I have mentored.

The purpose of this brief manuscript is to summarize the talk presented at the Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Award Reception at the 2010 Experimental Biology Meeting. As outlined in the materials provided to me, the presentation, and, therefore, this paper, was to be presented primarily for “…students, postdoctoral fellows, and new investigators about mentoring and being a successful mentor (or topics of a similar nature).” My preparation for this task was a challenge because there is a lot of good material available, including the previous presentations of Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Awardees available at this web address (http://www.the-aps.org/awards/society/bodil-recipients.htm).

There are two primary purposes with this communication. The first is to summarize the eight goals I have for those I mentor. These goals have evolved somewhat over the years; but as I look back, they have remained the same in principal. The second purpose is to summarize key factors and mentors in my life that have contributed to making me the person I am. The skills of a good mentor are the result of life experience and a commitment by the mentor to working for the good of others through disciplined focus. Because life experiences are variable I found myself wondering; from where did my mentoring skills come? As I considered this question, several important sources came into focus: family and home, teachers and coaches, faculty, graduate school experiences, and mentors in everyday life. These factors will be summarized below. Before discussing my goals for mentoring and the factors that have molded me into who I am, it seems appropriate for us to agree on a definition of a mentor.

What is a mentor?
According to Webster’s Dictionary (1992), “…a mentor is an experienced and trusted friend and advisor.” The word “mentor” can be traced back to Homer’s poem The Odyssey in which Mentor is the friend of Odysseus and the tutor of his son Telemachus. Thus, the concept of “mentor” is that of an experienced and trusted friend and advisor who also serves as a tutor. As I considered mentorship and leadership over the past few months preparing for this award, I concluded that my style of mentoring is most like that of a player coach. A player coach is one who simultaneously holds playing and coaching duties. A friend recently gave me a copy of Bill Russell’s book entitled Russell Rules. Bill Russell was a successful mentor to many basketball players as he won 11 championships in 13 seasons with the Boston Celtics and coached the team in two of those championships. He was the first African-American coach in the NBA and the first and only player/coach to win two NBA championships. He was the first to win an NCAA championship, an Olympic Gold Medal, and an NBA championship all in one year. HBO concluded that Bill Russell is the greatest player/coach and the greatest winner of the twentieth century. I have selected some quotes from Bill Russell because he is an outstanding mentor, as well as being the greatest player/coach of our time.

Bill Russell stated that “Great leaders …possess three flexible skills: toughness, tenderness, and the ability to know when is the right time to use one or the other.” (p. 73). In my view, this is true of great scientific mentors, as well as great leaders in any walk of life. There are times a mentor must be tough and times that a mentor must be tender. A major challenge is knowing when it is best to be tough and when it is best to be tender. Keeping the goals of mentoring in mind was helpful to me in deciding when to be tough and when to be tender.

Goal 1. Prepare each trainee for his/her future.
As I mentioned above, there is a large amount of literature available about mentoring. Review of this material makes it clear that there are several successful approaches to mentoring. I will not summarize them all; rather, I will outline the goals for mentoring that I have applied over the years. Only summarizing my approach and not summarizing others is not intended to suggest that my approach to mentoring is superior to the others; rather, it is how I have mentored. My primary goal for mentoring is to prepare my students/fellows for what they want to be, or in other words, what they believe their career will involve. It is not my goal to form more scientists like me or to use them as hands to accomplish my research. Some trainees are not sure what type of career they desire, so this expands the goal to include helping the trainee discover what they want to be as a scientist.

Goal 2. Encourage independent research ASAP in training programs.
The second major goal is to encourage
independent research as soon as possible for each mentee. It is important for the mentees to begin to do independent research as soon as possible after joining the laboratory because the most fulfilling research experience, I believe, is that which sprouts from the investigator doing the research. I encourage PhD students to incorporate into their thesis research new techniques/approaches that have not been previously developed and perfected in our laboratory. The importance of the trainees doing independent research was also of value to Schmidt-Nielsen, as reported by Dantzler. Dantzler indicated that “Dr. Schmidt-Nielsen believed that creative research was the only thing of any importance and that any other aspect of graduate education was relatively unimportant.” Schmidt-Nielsen “was an ideal mentor for the highly independent student.” Bodil Schmidt-Nielsen was an inspirational mentor. (Dantzler, W. H. Living History of Physiology: Bodil Schmidt-Nielsen. Adv Physiol Educ 30:1-4, 2006). Navar also emphasized the importance of a mentor inspiring the trainees and encouraging independent research as he stated, “A good mentor should be a shining beacon helping the mentee make decisions, but never making them for the mentee, and helping to provide the pros and cons of various avenues without directly telling them which one to take.” (L. Gabriel Navar, The Physiologist 49: 6, December 2006).

I think it is very important to help the mentee develop an area of research that can be continued when their training is completed. This is especially important for postdoctoral fellows. They need to start down the road of independence and be able to establish themselves without concern about competing with their mentor. To this end, we plan for the postdoctoral fellow to develop an independent research program during the second and third year of training and to develop at least one independent grant application by the end of year three.

Goal 3. Teach the trainee that science is a passionate pursuit of truth. The third goal of mentoring is to teach the mentee that science is a passionate pursuit of truth, not a pursuit of glory. I believe this is the heart of bioethics in biomedical sciences. Given that the reason for doing research is discovery, then misconduct does not make sense, for it will slow down or prevent discovery. Also, as summarized below under goal 7, a good mentor needs to teach mentees the importance of peer review. Peer review is critical in the passionate pursuit of truth.

Goal 4. Create and maintain a rich, scholarly environment. One of the most important things I do as mentor is to create and maintain an environment in which developing scientists can flourish. How well they do in the environment is largely determined by them and how they use what is offered. My job is to try to sustain a positive, exciting environment. Part of maintaining a powerful environment is the recruitment of students and postdoctoral fellows to the laboratory. I believe that research is more fun and productive when accomplished in collaborative groups. Quality students and fellows are attracted to a strong environment in the laboratory, in the department, and at the institution. I have been blessed by having quality students and postdoctoral fellows over the years.

Goal 5. Teach and demonstrate solid experimental design. My fifth goal of mentoring is to teach solid experimental design. In my experience this is best accomplished through demonstrating solid experimental design in ongoing projects, developing research projects, and in the student’s thesis research. Developing scientists need to learn how to determine required control experiments and to seek peer review of experimental design at each step of experiments. Also, trainees need to learn to ask questions and experience the fact that it is more important to understand than to appear smart.

Goal 6. Invest time in each trainee. My sixth goal of mentoring is to invest sufficient time in each trainee. Investing sufficient time in each mentee became a challenge when I was appointed as Department Chair. To help assure sufficient time, I strive to schedule a one hour meeting each week with each student and postdoctoral fellow. Sometimes we don’t spend the whole hour; sometimes we do. Mentees are also expected to attend bi-monthly lab meetings and weekly journal club. In addition mentees are expected to attend seminars in the Departments of Biomedical Sciences and Medical Pharmacology and Physiology, and as well as at the Dalton Cardiovascular Research Center at MU. Trainees are also encouraged to attend weekly cardiology grand rounds at the school of Medicine. All of these venues provide opportunity to talk about science and help the trainees fine tune their interactive skills.

Goal 7. Teach trainees to seek and appreciate peer review. Teaching mentees the importance of peer review is another key goal of mentoring in my laboratory. Peer review should be sought by the mentees in the laboratory, among local colleagues, and outside the university. For many, being criticized is an unpleasant occurrence. Indeed, often I hate it. However, criticism can make science better. Compliments just make you feel better for a time, but they do not make the science you do better. Criticism can make your science better. Trainees need to cultivate peer review and learn to appreciate and be thankful for criticism, even when it hurts. One important component of this is for them to attend national meetings and present results at these meetings. We strive to have trainees attend an APS scientific meeting and one other national meeting each year.

Goal 8. Provide support to the trainees throughout their careers. Ideally mentoring establishes a relationship. These relationships are a rich blessing. Being a mentor does not end when the mentee moves on to the next stage of career development. Indeed, the relationships can be as rich after the mentee has moved on as they are while they still work in the laboratory. The mentor should provide support for as long as needed. I have found that the relationship with each mentee is unique, but one constant is that I care about them. It is fun and gratifying to watch the careers of the mentees develop. While development of a good relationship is important in mentoring, it is important to emphasize that while I am thankful for the mentoring experiences I have had over the past 25 to 30 years, it has not been easy. Mentoring is hard work and often it is necessary to be tough even if you are a “nice guy.”

What were key developmental components in my life that developed me as a mentor? For the sake of argument, let’s accept the assumption that I am a good mentor. What were the key components in my life that developed mentoring skills? As I have thought about this question over the past few months, I concluded that I cannot over estimate
The impact my first mentors, Mom and Dad, had on me. My father, Charles Maurice Laughlin, had severe health challenges as a child and endured years of physical therapy before he could walk. Throughout his life, he had limited use of his right leg and very limited use of his right arm and hand. Dad was an outstanding farmer committed to food animal husbandry and producing food for mankind. He encouraged me to find something to do with my life that I would enjoy so much that I would be happy to work hard at it. Dad considered hard work a virtue and desired to outwork anyone with whom he worked. In his opinion, my job was not hard work because hard work did not include reading, writing, or anything done while one is seated at a desk.

Dad consistently refused to use the phrase “I can’t.” He could not accept that he couldn't do something he considered needed to be accomplished. He often said that “There is nothing you cannot do unless you are willing to say, ‘I can’t.” Phil. 4:13 states: “I can do all things through Christ who strengthens me.” I think this attitude developed in my dad as he spent years in physical therapy and throughout his life as he struggled with his disabilities, but I do not know for sure. Dad sustained this attitude to a fault as age mercilessly took the strength from his arms and legs. Yet this attitude was required for success for much of Dad’s life, and I believe this attitude can be an asset in many areas of life for everyone.

My mother, Charlotte Olive (Starke) Laughlin, taught me the importance of things of faith. She is a Methodist preacher’s daughter and has lived out a wonderful relationship with God through Jesus Christ for over 92 years. My commitment to the search for truth, integrity, and relationships was formed in this context. Even today, the most important relationship I have is with Jesus Christ. Psalms 21:1 states, “The Lord is the strength of my life; of whom shall I be afraid?” My mom and dad taught me the importance of priorities: God, family, country friends and profession.

Bill Russell said, "I spent my early years around people who did not have material wealth or big names but who taught me everything I needed to know about winning. I learned that it did not matter what kind of job you had but what kind of work you did." (p. 213). When Bill Russell says what kind of work you do, he is referring to the quality of your work. My parents had similar views about work. They believed that no matter the task you should work hard to accomplish the task and do it well. In my parents’ view, any job (profession/employment) is a good job. Dad assigned me many jobs on the farm that I did not consider good jobs at the time. However, I now realize that I learned important lessons from these jobs.

I am thankful for the rich mentoring I received as I grew up on a small Iowa farm. I remain to this day an Iowa farm boy who loves physiology. The family team work and community team work required to farm in those days were rich experiences. I believe these experiences were important in developing the enjoyment I have from, and success I have had with, collaborative research.

The great mentors I had throughout my schooling were also important in my development. My coaches: Coach Hansen (track), Coach Brooks (baseball), Coach Ward (basketball and life), and my favorite science teacher, Mr. Graves, taught me the importance of discipline, attention to details/basics, and hard work. In the sports in which I participated, I loved practice, even when all we did was conditioning. These were men of integrity who were committed to education and to helping boys and girls become good adults. I also had good mentors during my college years at Simpson College, Mr. Stockton, Dr. Watson and Dr. Meinitz fueled my love of science, and the discovery and wonder of biology and chemistry.

John Diana was my thesis advisor in graduate school at the Univ. of Iowa. He taught me a love for the microcirculation of cardiac and skeletal muscle. He and the faculty in the Department of Physiology and Biophysics at Iowa prepared me well with fundamental physiology. I took every physiology course I could fit into my schedule. Also, the comprehensive exam used there was a great experience for me. I remember with fondness the experiments I did with Jack Rall using thermocouples to measure the heat produced by contracting skeletal muscle. I also remember doing experiments with cardiac glycosides on isolated rat papillary muscles for Mike Brody, as well as the other projects I was assigned for my comprehensive exam. What a great six months it was.

My postdoctoral training at the Univ. of Iowa was accomplished with Drs. Tipton and Diana. Working with Dr. Tipton taught me so much about exercise science and about running a laboratory. I also learned how to use laboratory meetings/journal clubs to teach students and fellows to think critically and communicate science rigorously as I worked as a trainee in Tipton’s laboratory. There are many memories of issues that relate to mentoring that I remember from Dr. Tipton. One example is that I credit him with telling me that one can help a good student become a good scientist, and one can slow a good student down; but if that student is interested and equipped to be a good scientist, that student will develop with or without help. He also taught me to not worry about competition in science because there is always room at the front of the line. During those years, I also learned much about the coronary circulation from Dr. Mel Marcus.

Following four years of research experience in the United States Air Force as an Aerospace Physiologist, I came back to academia. My mentors when I became a new Assistant Professor were Bob Armstrong and Fred Peterson. Fred Peterson was a key advisor, good friend, and role model of a committed teacher and research scientist. Bob Armstrong is the best example of a mentor for a new faculty member that I have known. He was, and is, an experienced scholar and research scientist, trusted friend, superb advisor and effective teacher. I learned many secrets of success in teaching and research from Bob. Bob Armstrong was nothing short of a wonderful mentor. I still believe that Bob was more excited about the funding of my first NIH grant than I was. Those years of working with Bob Armstrong, who was never concerned about who got the most credit for our work, remain as precious memories for me. As has been true throughout my life, I grieved the transition in my career that took me from that phase of my life to the next phase. However, now I realize that the Univ of Missouri was the perfect place for the final development of my career.

The move to the Univ of Missouri has been wonderful. The large number of outstanding colleagues at MU has provided a rich, stimulating, exciting environment in which to develop most of my career. Early on, I learned about grantmanship from Drs. Allen Jones and Richard Adams, my department chairs at the time. There are a large number of outstanding colleagues at
MU who have provided a rich, stimulating, and exciting environment in which to develop my career and train students and postdoctoral fellows over the past 25 years. I have also been blessed with outstanding staff in my laboratory. Currently, Pam Thorne, Ann Melloh, and Dave Harah play key roles in training students and postdoctoral fellows in my laboratory. They are key components of my research and of mentoring trainees in my laboratory.

For the past 40 years, there is one person who has been the central focus of my life and the major tool God has used to make me who I am, my wife. She is the love of my life. She and my family have been a major force in making me who I am. Doing the best I could to be a father to my three bright, energetic, and wonderful sons taught me much about mentoring. My family, as well as many of my trainees, knows that I am quite boring. I enjoy work, exercise, and solace. But the joy of my life is linked to my wife and family. Lynne is my love, the mother of my sons, grandmother of my grandchildren, my best friend and my constant advisor/partner. It is important to emphasize that I do not believe I sacrificed family for career. Rather, I believe that my wife and family chose to sacrifice time, energy, and resources along with me, to allow me to pursue my science dreams. We did this together.

Equally, we strove together to fulfill the dreams of each member of my family. When the boys were young, this was soccer. As they matured, they each developed their dreams.

I love physiology and biomedical science, but my identity is not just as a scientist. I am a man, husband, father, and grandpa who teaches and does science. I think it is important to sustain relationships and love in your life while completing what must be accomplished to be a successful scientist. This can only be accomplished by discipline driven by priorities. The principle of living a full life while working hard to be an outstanding scientist is one that I have tried to live out for my trainees.

So in closing, I must express that I am grateful for the recognition, and I am honored to be associated with an award named after Dr. Bodil Schmidt-Nielsen. It is both a blessing and a humbling experience being selected for this award. I am grateful to receive this recognition based on the evaluation of my scholarship and the opinions of those I have mentored. Further, it is an honor to be both associated with an award named after Dr. Bodil Schmidt-Nielsen and with the colleagues who are listed as previous Bodil Schmidt-Nielsen Distinguished Mentor and Scientist Awardees. I thank the APS Women in Physiology Committee for establishing the Distinguished Mentor and Scientist Award. I also thank Dr. Jane Reckehoff and the members of the Selection Committee for selecting me for this award. I thank those who supported my nomination, both my colleagues and trainees.

I recognize that I am still just an Iowa farm boy who loves science and who has been exceedingly blessed. As I look back over the years, I find that I am deeply thankful for the series of appointments/jobs I have had. I am thankful for the wonderful colleagues and mentors with whom I was blessed to work. I am also thankful for the outstanding students, fellows, and junior faculty with whom I have worked. I honestly believe that any scientist, who was identified as the mentor of these students and postdoctoral fellows, would appear to be an outstanding mentor. I am thankful for my role in their lives and for all I have learned from them. The research and publications that this award recognizes were the result of the outstanding students and fellows who have worked with me. Truly, the award should be to all of us as a team, not just to me. I thank each of my trainees who were able to attend the luncheon, I was greatly honored by your presence. Finally, all the glory should be to God. I thank my Lord and Savior for all the blessings I have tried to summarize herein.

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**Temporary Program Director**

Proposal submission is not in response to a specific targeted announcement but is based on a PI's interest in an important biological question. This "bottom up" policy is in contrast to the recent trend of diverting funds from core programs in order to finance research based on proposals answering to solicitations in more narrowly focused, mission-oriented areas as defined by NSF ("top down" policy). Finally, NSF benefits from the scientific expertise of the rotators who are hired to deal with proposals in a specific, albeit quite broad, scientific area (e.g., animal physiology). Therefore, when a PI speaks with the rotator, he or she is speaking with a scientist who has a direct, relevant, and recent understanding of the unique challenges of that discipline.

**What would motivate a scientist to leave her or his academic institution to work at the NSF for a year or more?**

Rotators are generally mid- or late-career scientists who are motivated by a desire to "give back" to an agency that has supported their research, provide a service to the greater scientific community, and satisfy their curiosity about how the NSF actually operates. In addition to satisfying these motivations, there are other benefits to serving as a rotator. Management of proposals exposes the program director to a diversity of cutting-edge research, resulting in an increased appreciation for the breadth of questions being addressed in the biological sciences. In addition, program directors learn about educational and research initiatives in biology, as well as other areas of science and engineering through seminars and participation in committees and working groups across the Foundation. Finally, serving as a rotator means living in the greater Washington, DC area where cultural, dining, and entertainment opportunities abound.

One of the greatest challenges for rotators, however, is making sure their own research program does not suffer while working at NSF. All program directors (including permanent ones) are allowed 50 days per year to pursue scholarly activities (termed Individual Research/Development, IR/D). For rotators this usually means time to return to their own research laboratories to oversee operations there. In addition, program directors keep in touch with their labs via the phone and videoconferencing. IR/D can also be used for other activities such as traveling to collaborator's laboratories, writing papers, attending scientific meetings, or taking courses. NSF