

Operation Double Doc
APSA Newsletter Volume I, Number I

June 2006

In This Issue

- Welcome!
- From the President's Corner
- MD/PhD Programs: One Size Does Not Fit All
- Pursuing Clinical Research: A Case Study
- APSA? What's APSA?
- Physician and Scientist . . . Two Strands of the Helix?
- A Road Less Traveled: Transition to the Lab
- A Happy Medium: Five-year Research MD Programs
- Connecting with the fUTRe: fMRI & You!
- APSA Project: Residency Database

Greetings,

Welcome to the first newsletter of the American Physician Scientists Association. APSA is geared towards the career development and community building of physician scientists.

Welcome!

Jason R. Mann, Ph.D., Vanderbilt University

I don't know about you, but in my experience the quest for double doctorhood is exciting, challenging, and . . . lonely. Do you ever feel like you don't quite fit in any one world?

(my grandma) When are you going to get a real job? (science friends) Why are you going to the hospital? (clinical friends) When are you going to stop playing in the lab and do some real medicine? Sometimes I feel like no one understands the agony and ecstasy of this path.

But we need biomedical breakthroughs, and that means more physician-scientists. In fact, it is precisely because the worlds of science and clinical medicine can be so disparate, so difficult to span, that we need effective bridge-builders. Our patients need to experience the breakthroughs, not just read about Mickey, the amazing mouse cured of cancer or muscular dystrophy. This hope can only be realized by close collaboration between clinicians, basic researchers, and physician-scientists. This synergy transforms mere invention into innovation, solves intractable problems and changes the lives of real people. But the summit road is steep and rocky. This provides the motivation for APSA and this newsletter, to remind us that we're not alone and share some hard-won insights for the journey.



This Issue

In this issue, we open with a recap of the annual meeting in Chicago and hear from our founder and president, Freddy Nguyen. The theme of this issue is "one size (does not) fit all," and brief case-study articles from APSA members highlight the wide range of opportunities to combine clinical and research interests. Just as the roads to a physician-scientist career are varied (I studied Tang dynasty poetry in college and applied to the PhD after the first year of medical school), there are many

different opportunities to receive training, and in turn, contribute to this vibrant community for greater health and understanding in the twenty-first century. Many programs lead to both MD and PhD degrees, but new arrangements provide alternative pathways. Whether you are already in medical school or simply considering your options, we hope you find these real-life stories to be helpful.

APSA Activities

In addition to supporting MD/PhD students, APSA also seeks to reach out to the general medical community. We had the opportunity to present to a national audience at the AMA student meeting in Chicago in June:

Research Careers and Opportunities

As the practice of medicine becomes more evidence-based, the value of performing scientific research will become an invaluable experience for future physicians. Come find out about various medical research options available to medical students, including research fields, career pathways, and funding opportunities.

Finally, some of our members will present research findings at the upcoming MD-PhD student meeting in Keystone, Colorado. APSA will present a poster to describe the organization and host two breakout sessions:

Career Development--What are my options? (Jason Mann and Jennifer Dan)

So you have great ideas and want to improve the life of each patient . . . but how do you translate these skills and dreams into a paycheck that will keep food on the table? Practical mechanisms and pathways will comprise the meat of this round-table discussion.

How the Hospital Makes Hank Break the Law: A Social Research and Case Discussion (Scott Stonington and Seth Holmes)

This session is an introduction to social science in clinical medicine. It is intended both for MD/PhD's in the sciences who are looking for a fresh break from the science-heavy Colorado conference and for students in the social sciences and humanities. In the session, we will present two cases. First, the case of Hank, a homeless heroin user who finds himself trapped between the demands of the San Francisco public health, police and hospital systems. This triad of institutions drives Hank into a strange set of conundrums and plot twists that reveal fundamental concepts at work in health care today. The second case will discuss Khaew, a Thai construction worker who ends up in the ICU on a ventilator. Khaew's family will take us on a journey through an extraordinary non-Western bioethical system, where doctors and patients alike use karma, reincarnation, paternalism and ghosts as their ethical principles for making decisions. At the end, this case will allow us to build a theory of what would happen if Khaew came instead to a Western hospital with his same injury.

In addition to those sessions, APSA will host an informal opportunity to connect members with our leadership over breakfast on Saturday, May 8. RSVP to if you are interested in attending.

This brief outline highlights only a few APSA activities. Your creativity and contribution are most welcome as we grow and seek to meet the needs of physician-scientists in training. As for the newsletter, APSA will publish two issues per year. Submissions for January 2007 are welcome:

anything that would be of interest to those in the physician-scientist community—creative pieces, interviews with investigators at your home institution, mistakes or lessons learned, as well as things that worked well. Please contact with any suggestions or ideas. But for now, read on to hear stories and bits of advice from members around the country, as well as opportunities to plug in to APSA and contribute to the future of biomedicine.

From the President's Corner

Freddy T. Nguyen, University of Illinois Urbana-Champaign



This year has marked tremendous growth for the American Physician Scientists Association. In addition to furthering our alliances and impact of APSA, we have been able to bring about several new initiatives capitalizing on the organization's momentum to benefit and support future physician-scientists.

The second Annual Meeting was held in Chicago, IL on April 28 -30, 2006 bringing together more than 110 MD-PhD, and MD students from across the country representing every stage of training, institution type, and geographic location. The meeting was held in conjunction with the American Society for Clinical Investigation, whose Joint Meeting with the Association of American Physicians brought together nearly 600 members, representing the leaders in academic medicine and corporate healthcare. The combined meeting brought stellar speakers with a focus on presenting cutting-edge biomedical research and in fostering and nurturing the future generations of physician-scientists through inspiration, leading by example, mentoring sessions, training and career panels, and networking.

APSA has continued to grow in presence and in representation. In an effort to better reach our target audience, APSA leaders and institutional representatives have proactively represented the organization at the American Medical Association – Medical Student Section (AMA-MSS) Annual Meeting in Chicago, IL this past June as well as the National MD/PhD Student Conference in Keystone, CO this upcoming July. During this time, the executive council maintains a healthy relationship with the leaders of the AMA-MSS furthering our active collaboration. Look for us in Colorado as we will be presenting a poster on APSA as well as chairing two of the breakout sessions. In an effort to continue our international presence, I will be visiting our Swiss counterparts, the Swiss MD-PhD Association, this upcoming weekend in Basel, Switzerland meeting with Founder and President David Winkler, MD, PhD and his colleagues.

The growth in active institutional representation continues at an amazing pace thanks to APSA's continuous outreach to medical students. From the original four schools that founded APSA in 2003-2004, we now represent nearly 60 medical institutions in the United States and Canada doubled from the previous year. APSA members, who serve as Institutional Representatives and/or Standing Committee Members, represent the voice of future physician-scientists and are the future

leaders of medicine. They represent a wide myriad of training pathways including students enrolled in MD-PhD combined degree programs, students in 5 year MD programs with one year of dedicated research, to PhD students making the transition to medical school, and vice-versa. They also represent past, current, and future leaders in other medical student organizations, and their own institutions.

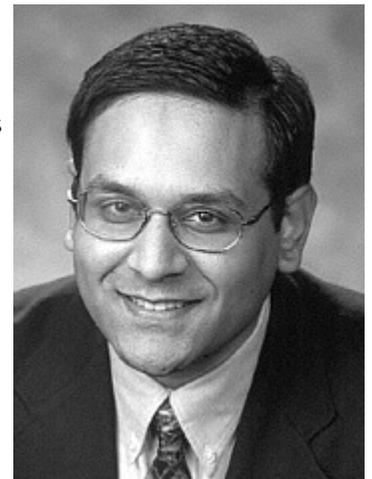
Thanks to APSA's continued growth and presence in the medical community, several new initiatives have come forth. The first initiative has been to outreach to all medical students currently pursuing formal research training by providing them with a support network and career development sessions. Through APSA's Annual Meeting and online discussion forums, we are able to provide an unprecedented resource to all students alike. This initiative is further achieved through an active collaboration between APSA, the AMA-MSS's Committee on Scientific Issues, and the National Student Research Forum where all three groups will actively promote and engage in the planning of our respective national meetings. The second initiative is the official establishment of a biannual newsletter which you are now reading. These newsletters are meant to connect students from all over the country sharing their own experiences about innovative and novel training approaches from their respective institutions, provide upcoming opportunities for students to connect at meetings, highlight upcoming deadlines for fellowships / research grants for medical and MD-PhD students, as well as to inspire students in their continued pursuit of becoming a physician-scientist.

On this note, I encourage you to learn more about APSA has to offer you and to actively contribute to the organization. As an organization founded by students and more importantly for students, we strive to address the needs of physician-scientist trainees. I urge you to engage the members of the Executive Council by email, phone, or in person as we are always open to new ideas and hearing from our membership. I look forward to continuing to serve as your President over this upcoming year.

MD/PhD Programs: One Size Does Not Fit All

Chirag B. Patel, University of Texas-Houston

Here at UT-Houston Medical School, our MD/PhD program is unique in that it encourages us to complete three years of medical school before pursuing doctoral research in the lab. The vast majority of US MD/PhD programs go by the 2-3-2 schedule, wherein students complete the first two years of medical school (basic sciences), undertake three years of research towards their PhD (although this number is incrementally increasing each year), and then enter the hospital to complete the last two years of medical school (clinical rotations).



Thus, our program offers the flexibility of a 3-3-1 route or the traditional 2-3-2 path. Our Program director, Dianna Milewicz, MD, PhD, likens the 3-3-1 course of study to riding a bike. In other words, during the first two years of medical school we learn the theory behind treating patients and during the third year we put this basic science knowledge into

practice. As with riding a bike, once you learn how to do it, you won't forget. This can be of benefit when returning to complete the fourth year of medical school after spending a few years in the research lab.

Moreover, the experience of having treated patients for an entire year provides the MD/PhD student with the clinical perspective necessary to pursue truly translational research during the PhD years. With the goal of treating the patient in mind, the student can ask questions linked to the disease process and manifestation. Whereas much research is pursued from the bottom up (e.g. hypothesizing that a particular biochemical or molecular process may be implicated in a non-specific group of diseases), the top down approach (e.g. searching for mutations in samples from patients with a particular disease) may accelerate the rate at which the so-called "bench to bedside and back" process takes place.

UT-Houston Medical School is situated within the Texas Medical Center, known as the world's largest medical complex (42 institutions, 5.2 million patient visits per year, and 6,344 aggregate patient beds). Students in our program benefit from UT-Houston's own basic science and clinical departments and its strong collaborations with its sister institution (the University of Texas MD Anderson Cancer Center) and the Texas Institution for Rehabilitation and Research, among others. Indeed, the extent of research pursued here is seemingly endless. Please feel free to check out our program website at .

Pursuing Clinical Research: A Case Study

Brian S. Fuehrlein, University of Florida



The University of Florida (UF) College of Medicine and the General Clinical Research Center (GCRC) actively engage first year MD-PhD and medical students in clinical research. While the UF MD-PhD students typically complete the traditional basic science PhD, this additional program allows for the development of future clinical investigators, a unique concept among medical school curriculums.

In December of their first year, MD-PhD students complete a 3-week rotation in the GCRC where they attend ward rounds and engage in interactive discussions with a variety of faculty members on issues relating to clinical research, such as statistical design and protection of human subjects. Additionally, the students attend meetings of the GCRC Advisory Committee and of the Institutional Review Board. The primary focus of this rotation is to formulate a research experiment that engages first year medical students as either volunteer subjects or as bedside investigators and is thus undertaken by the entire first year medical school class. The MD-PhD students have five months to field critiques from classmates, obtain IRB and GCRC approval and finalize the design. In May, the GCRC is turned over the MD-PhD students for one week to complete the experiment. Once the study has ended, work on data analysis, conference presentation and journal publication lasts approximately two years.

Although it is critical that MD-PhD students be properly trained in basic science research, it is equally important that the art of clinical investigation not be ignored. The UF GCRC program affords the MD-PhD students the opportunity to experience all aspects of a true clinical research project and even involves all traditional medical students in an effort to draw them into a career of clinical research. The importance of instituting a program similar to this nationwide could be far reaching, as there was a statistically significant decline in percentage of matriculating and graduating medical students who expressed strong research career intentions and physicians reporting research as their primary focus dropped by 6% during the past two decades. UF has proven year after year that a program like this can enhance the normal medical school curriculum and prepare the future of medicine by ensuring those who are interested in clinical research are adequately exposed to it.

APSA? What's APSA?

Steven K. Lau, University of California-San Diego

I'll always remember my first patient. She came to UCSD's student-run free clinic with problems hearing. After a brief workup, it became evident that she had an unfortunate case of earwax. In my premedical naiveté, I neither expected to "cure" earwax in the clinic nor at the bench. After all, what study section would fund a project on earwax? I was surprised then one morning, to find the genetic basis of earwax make headlines (1,2). Somebody thought it was important and was willing to financially support earwax research.



Much noise has been made about the alleged expansion of the military budget at the expense of other federal programs including funding of scientific research and healthcare initiatives. Consider a military officer trained on United States soil. In 2003, the Navy reported that training one jet pilot cost \$1,439,754 (3). Are fighter pilots sufficiently productive to justify the investment?

Some claim that MD-PhD programs, like the military, are an inefficient use of limited resources. These concerns, in part, have fostered hopes for developing more efficient methods of physician-scientist training including NIH Loan Repayment Programs for so-called "late bloomers" and the HHMI Med-Into- Grad Initiative for PhD students with clinical interests.

As with fighter pilots, multiple variables confound the cost- benefit analysis of training MD-PhDs. For example, how do the government and the scientific community evaluate post- graduate success and productivity? Justification of federal investment will inevitably be based on quantifiable results as it has in the past (4).

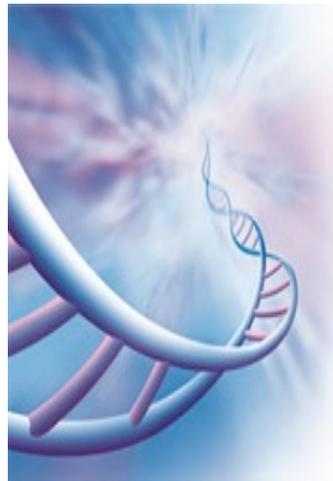
Training one fighter pilot costs considerably more than training an MD-PhD student, even with the cost residency. However, because fighter pilots fill a unique niche, it is rare to find one who would dispute their training. Do MD-PhD programs perform a unique service to society?

APSA has the opportunity to fill this gap for MD-PhD trainees. In the past, established faculty have served as the primary proponents of physician-scientist training. Although our perspective is admittedly limited and biased, students need to form a cogent voice advocating our place in the scientific community – before it is too late and others decide we are a failed experiment.

1. Wade, N. "Scientists find gene that controls type of earwax in people." New York Times, 30 Jan 2006.
2. Yoshiura K, et al. A SNP in the ABCC11 gene is the determinant of human earwax type. Nat Genet (2006) 38:324 -30.
3. Naval Education and Training Command (NAVEDTRACOM). Cost Factors Handbook (fiscal year 2003), 165.
4. National Institute of General Medical Sciences (NIGMS). The Careers and Professional Activities of Graduates of the NIGMS Medical Scientist Training Program (1998).

Physician and Scientist . . . Two Strands of the Helix?

Kofi A. Mensah, University of Rochester



As another academic year draws to a close and the day of graduation with the dual degree gets closer, the perennial question arises: how does one effectively combine the clinical and scientific aspects of medicine? While the answer to this question may not be as textbook as a cell-culture protocol, several institutions have a framework in place to help students along in defining the answer that will be best for their individual interests.

At the Medical Scientist Training Program of the University of Rochester, for example, students are exposed to both facets of our chosen career from the start. With direct patient care beginning in outpatient preceptorships the second semester of first year and continuing throughout the program, students not only get a chance to taste what medical practice is like, but also to use the experiences with patients as the springboard for questions that might serve as future thesis projects. In this way, the Double Helix Curriculum at Rochester helps students in the MSTP anneal their passions for scientific and clinical medicine. Students find the research environment here to be very collaborative. A second year in the program said, "it is very people-centered and friendly. [Her] lab community is small enough to be able to talk to everyone openly and ask questions. It is a great teaching environment." This is in keeping with the words of Rochester alum Arthur Kornberg ('49) who, while working on the real double helix, said, "all we should ask the scientist to do is find the truth - and then not keep it from anyone."

While Kornberg's Nobel Prize-winning work and the discoveries based on it demonstrate the importance of basic science research in medicine, it was another Rochester pioneer, George Engel, whose 1977 publication of the biopsychosocial model in *Science* (the *Cosmo* for our profession) provided the basis for the other strand of the curriculum by emphasizing that physicians (by definition concerned with *physic*: natural science) should not forget that there are psychosocial aspects that impact the

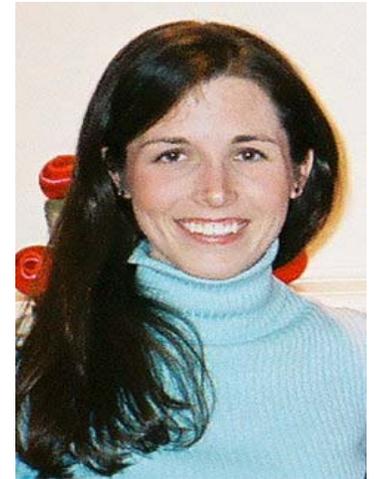
biological processes which serve as our subjects of study and bring patients to our attention. A recent graduate highlighted the utility of this strand to the budding medical scientist when he commented that he liked the ability to "spend one semester in an outpatient TB clinic, which greatly enhanced and reinforced the clinical application of [his] research project."

We will all struggle to polymerize our version of the ideal physician-scientist career. At first, it might seem that, like a real DNA double helix, these two strands of medicine are antiparallel; however, with the right framework in place as exemplified by the Rochester curriculum and similar curricula across the country, we will be able to put this perennial question out of our minds for a little while and enjoy the ride. After all, isn't part of what makes a career in scientific research fun the uncertainty of what you might discover along the way?

A Road Less Traveled: Transition to the Lab

Kim Parker Gannon, University of Mississippi

After conquering the USMLE Step 1, we move into another dimension of sorts. While our peers head off to the wards filled with a variety of diseases, we set out studying viruses, bacteria, cell cultures, mice, rats, etc. It's a different world! Many of our friends walk the halls in their starched white coats and we exchange the normal greeting - "What rotation are you on now?" Because of this, you may have found that the first few weeks of graduate work are daunting and lonely. BUT - we are privileged! No more pick one of the five answers given to you - we have the freedom to create and develop new ideas and lab procedures. No set hours - but the autonomy to arrive as early and work as late as we choose; a chance to master time management and learn to work effectively and efficiently.



Graduate school is largely what you make of it. Some students will undoubtedly have more controlling PI's; but it's up to us to create our own path. You're on the brink of discovering something that no one else has ever known! It's a chance to dive into your chosen research as deeply as you choose - to learn everything that there is to know about your subject and offer your knowledge and discovery to the scientific community, and furthermore use your background to link this new research to the practice of medicine. Do not sit back at your comfy new desk and loll the hours away - get up and realize your potential! Some say that we are indecisive or fool-hearted for taking this longer path, but I believe that we are dedicated students working to translate bench work to clinical practice.

Mississippi Update

At the University of Mississippi Medical Center, MD/Ph.D. students are a novelty. Our first combined degree graduate completed the program in 2004. At the moment seven students of the program are engaged in graduate studies including Physiology, Microbiology, Pathology, Biochemistry and Neuroanatomy. This year we are beginning a reading club for all MD/Ph.D. students during the research years. We plan to

cover the textbooks assigned to the third year medical students and read them before we arrive on the wards. This plan has several functions: not only will we create a network of support and be a source of encouragement for one another, but this will also keep us connected to the world of medicine. This reading will provide us with ample preparation for when we do re-enter medical school in that we will be familiar with the material that many M3 students simply do not have time to read and process during clinical rotations. We are just beginning - watch us grow!

A Happy Medium: Five-year Research MD Programs

Stephanie T. Weiss, PhD, Cleveland Clinic



Although many student physician scientists enroll in MD/ PhD programs, there are also five-year programs that award research MD and/or MD/MS degrees. These programs are ideal for students who want to be researchers, but who do not want to complete an entire PhD. One such program is the Cleveland Clinic Lerner College of Medicine, located in Cleveland, OH. CCLCM is a joint program between Case Western Reserve University and the Cleveland Clinic Foundation (www.clevelandclinic.org/cclcm). The 32 students in each CCLCM class are officially Case students, but we have our own curriculum that is for the most part independent of the main Case medical school program.

CCLCM is specifically geared toward students who want to go into research, and several significant blocks of research time are built into the program. First, the program starts much earlier than most medical schools do. During the summer before M1, all CCLCM students conduct a basic science research project. Second, the summer after M1 is another required research summer for all participants. This time, the focus is on doing a clinical science research project. Third, CCLCM students undertake a year-long research project at some time during M3-M5. The clinical curriculum is flexible, so that students can choose to do their research in a year-long block, or to break it up and intersperse it with their clinical rotations over a period of two or more years. All CCLCM students are required to write a masters-level thesis to graduate.

There are several other unique features of the CCLCM program. Probably the most surprising thing to many people is that we have no tests, no grades, and no class ranking at any point in the program. Instead, we assemble portfolios that demonstrate our competence in several key areas, including clinical skills, research skills, professionalism, and science knowledge. In addition, we do not have any lecture courses at CCLCM. Instead, all of our classes are PBL and seminars. We are able to do this successfully because the class size is so small. Third, we do not use preserved bodies or perform dissections for anatomy; instead, we learn from prosections during M1 (with opportunities for optional dissection during M2).

CCLCM is a fairly new program that welcomed its first entering class in 2004. These students are now rising M3s who will graduate in 2009.

Most of us come to CCLCM already having some research experience, and many students have taken time off after college to do research before starting medical school. Two of us began the program already having our PhDs. We are very excited about opening our new CCLCM APSA chapter, and we look forward to working with Tom and the main Case APSA chapter to serve the student physician scientists at Case.

Connecting with the fUTRe: fMRI & You!

Amanda Cuevas, University of Illinois Urbana-Champaign

When you think of fMRI, what comes to mind? You probably think of Functional Magnetic Resonance Imaging, right? Well, at the University of Illinois College of Medicine at Urbana- Champaign, fMRI has another meaning. At Illinois, fMRI stands for future Medical Research Investigators Pre-MD/PhD Club. The organization was established in 2001 specifically to give undergraduates interested in pursuing an MD/PhD the skills and tools they will need in order to become successful applicants to MD/PhD programs. This is accomplished through a variety of mechanisms—many of which are in conjunction with the activities of the UIUC Medical Scholars Program (MSP), one of the largest MD/PhD programs in the country. fMRI currently has approximately 250 members.



fMRI holds a monthly meeting throughout the academic year in which certain topics of interest relevant to pre-MD/PhDs are presented. Examples of typical programs include:

- MD/PhD directors or representatives to give recruiting talks about their programs
- Helpful hints for getting involved in a lab
- Mock interviews for club members to observe what an MD/ PhD interview might be like
- The MD/PhD application, interviewing and admissions processes
- Medical Scholars Program alumni give presentations on what life is like as a physician-scientist
- Summer Research Opportunities are presented

fMRI members are also invited to attend MSP events, seminars and research symposia to hear distinguished speakers give talks on additional topics relevant to MD/PhDs.

Furthermore, fMRI members are encouraged to participate in our annual Mentor Match where an fMRI member is paired with a current MD/PhD student to be mentored throughout the academic year. Mentors often give their protégés tours of their labs, meet monthly for lunch or coffee to discuss their current research, and/or provide support, encouragement and some guidance to aspiring MD/PhD students.

Members of the organization partner with other pre-health organizations on campus to participate in community service initiatives and medical

volunteering activities. In addition, our fMRI leadership team is currently working on establishing a physician-shadowing program within our local community that is expected to get off the ground this year.

Another helpful resource is our fMRI website . Although we are still developing this website, we do have available helpful information including links to summer research opportunity programs, helpful handouts about the MD/PhD application and admissions process, plus more.

If you would be interested in establishing an fMRI club at your institution or at least in implementing certain initiatives such as the Mentor Match Program and would like more information, please contact Amanda Cuevas, Medical Scholars Program Assistant Dean and fMRI Advisor, at either acuevas@uiuc.edu or 217-333-8146.

APSA Project: Residency Database

Mattie Nicholas, University of North Carolina



Residency application, a daunting process to begin with, become even more complicated for those interested in combining research with clinical practice. Since aspiring physician-scientists make up a relative minority among residency applicants, information about their options is more difficult to come by.

APSA hopes to address this problem with one of our most ambitious projects. A database of residency programs and other post-graduate opportunities is currently under development. Individuals at various stages of their residency

or fellowship training will be able to enter their experiences in a web-based survey. APSA members will be able to use multiple search criteria to find the best program fit for their needs and career focus, while also taking into account the experiences of physician-scientists who have gone before them. Members will even be able to find MD/ PhDs currently in a specific residency program who are willing to answer questions or advise them prior to application or interview.

Clearly this will be a vital resource as soon as it comes on line, but we also believe it will enact widespread and lasting change for the good of future physician-scientists. There is currently no mechanism in place to encourage entrance into supportive programs and away from less supportive programs. By publicizing both official policies and actual experiences of trainees at various institutions, this database will provide an incentive for residency programs to improve their offerings in order to attract the best applicants.

The physician-scientist faces a long and challenging career path whose ways are not always well-traveled. In addition, clinician- scientists are often best able to serve humanity as well as their own training goals by developing a customized curriculum in a supportive institution. By forming a community and sharing experiences we can improve training and future careers for all aspiring physician-scientists.

Well, there you have it. We hope this first issue brings encouragement (or at least diversion) as you strive to increase knowledge and bring healing. Remember to RSVP if you will be at the National MD-PhD Student Meeting in Keystone this weekend. Suggestions for APSA and future article submissions are also welcome.

Additional resources are available at www.physicianscientists.org, which should nicely complement your trusty collection of "High-Yield Blueprints of First Aid Recall Made Ridiculously Simple" pamphlets and miniprep protocols. And don't worry, my grandma said that pipette-tip-box re-filler-person could count as a real job if school doesn't work out.

With best regards,

Jason R. Mann, Ph.D.
American Physician Scientists Association

Email: apsa@physicianscientists.org

Web: <http://www.physicianscientists.org/>