Letter from the Editors
Hung Doan, University of Texas Medical Branch
Daniel Matson, University of Virginia School of Medicine
James Giles, The University of Manchester, UK
Evan Noch, Temple University
Curtis Gabriel, Vanderbilt University

This issue of \( \Phi \Psi \) continues our desire to offer our membership new perspectives on pursuing a combined degree. This theme issue focuses on the biotechnology industry. Contributor, Evan Noch from Temple University writes about alternative career options for MD-PhD graduates besides pursuing the traditional academic medicine route. He highlights private industry and also government job options and how balance can be maintained.

Also, James Giles from the University of Manchester in the United Kingdom provides three perspectives on industry collaborations and how one might meld basic research and industry.

Curtis Gabriel from Vanderbilt University School of Medicine, reviewed Rebecca Skloot’s *The Immortal Life of Henrietta Lacks*, the patient who succumbed to cervical cancer and whose cancerous cells are the famous HeLa cell line. The book looks into the lives affected because the cells were procured without Ms. Lacks’ knowledge or consent. This book delves into the fascinating world of ethics, scientific research, and even the biotechnology industry.

As a bonus, Curtis also interviewed Dr. Jason Mann, MD, PhD, a recent alumnus of Vanderbilt’s MSTI, the current Chairman of the APSA Board of Directors and the CEO of Multimeric Biotherapeutics, Inc. His personal experience offers insight into the role of an MD-PhD in private industry.

As always APSA President, Christopher Alvarez-Breckenridge writes the President’s Corner reminding us about the Spring APSA Meeting in Chicago, IL from April 15-17, 2011. As in the past, the meeting will be keynoted and attended by eminent physicians and scientists so please remember to sign up.

Finally the editors would like to thank the support of the APSA leadership in our endeavors. If you, the readers, would like to have more theme issues or find out more information don’t hesitate to email Daniel Matson or Hung Doan at hung.doan@physicianscientists.org. Thank you!

From the President
Christopher Alvarez-Breckenridge, The Ohio State University

Greetings fellow APSA members!

As the winter months have arrived, APSA finds itself between two of its busiest times of the year. In October and November, APSA led four separate regional meetings across the country [www.physicianscientists.org/meetings/regional] and reached out to over 500 meeting registrants. With captivating keynotes, interactive breakout sessions, and welcoming poster sessions, we strived to offer a diverse array of programs in order to provide of flavor for APSA related meetings. If you missed one of these meetings, I encourage you to be on the lookout for next year’s slate of regional meetings.

Looking forward, the 7th Annual Meeting is right around the corner [http://www.physicianscientists.org/meetings/annual/2011] and is being held on April 15-17th in Chicago. I encourage you to look at our meeting agenda where you will find such keynotes as Dr. Catherine DeAngelis (editor of the Journal of the American Medical Association), Dr. Harold Varmus (Director of the National Cancer Institute), and Dr. Michael Brown (Nobel Laureate, UT Southwestern) just to name a few.

As in previous years, our meeting will be held in conjunction (See President on Page 5)
Physician Spotlight: Interview with Jason Mann, MD, PhD
Curtis Lee Gabriel, Vanderbilt University School of Medicine

Jason Mann, MD, PhD, is the CEO of Multimeric-Biotherapeutics, Inc., a California-based biotech company that develops adjuvants in cancer vaccines. He also serves as the APSA Board of Directors for Chairman. Dr. Mann is a 2008 graduate of the Vanderbilt MStP, earning his PhD in the field of colon cancer biology. ΦΨ spoke to Dr. Mann on 12/2/2010. The interview transcript was edited for clarity and brevity.

You’ve had an incredibly diverse career since graduating from Vanderbilt, can you describe your current position and responsibilities?

My main focus currently is as CEO of what we call a seed-stage biotech startup. This is a small company that focuses on adjuvants—specifically cancer vaccine adjuvants. The company was spun off of some technology developed at the University of California-San Diego. I was recruited because they were looking for someone with a combination of scientific and clinical background as well as business savvy and an ability to present the product as an investment opportunity that could generate interest from venture capitalists.

What are the responsibilities of a biotech company CEO?

It’s all about people. And about funding. What you find—and I think new academic faculty members experience this as well—is that you can have the greatest idea and the most talented team, but nothing will happen without funding. Ultimately connecting and working well with lots of different people in order to raise funding is the most important part of what I do.

Can you describe your typical workday at Multimeric-Biotherapeutics?

Unfortunately, it’s hard to give a short answer. I would say that there’s two main parts: one is raising money by talking to investors. These include wealthy individuals or venture capital firms who listen to different company pitches and basically pick a very few that will receive investment for further development. That’s the first step—to just get money so you can rent space, keep the lights on and hire employees. The second main half is technical: talking to scientists, talking to technicians, talking to academics, going to conferences and basically trying to figure out what to do with the money. For example, determining the key experiments that will help us move the drug development process forward.

How did you make the leap from your days as an M.D.-Ph.D. trainee to being a CEO of a biotech company?

After graduation, I moved to Silicon Valley. I felt that my clinical and scientific backgrounds were reasonable from a biotech standpoint, but I really didn’t have a lot of business experience. I thought about going to business school but decided to get a little more hands-on training by joining a management consulting firm called McKinsey & Company. In my second year, I left to assume an operating role by helping to run a mid-size biotech company. While there, I was recruited to be CEO in an even smaller startup.

Do you think you could have gone directly from the MD-PhD program into the operating role you filled after leaving McKinsey?

I think it would have been very, very difficult. You need a basic business toolkit that you could probably get with an MBA. I found the management consulting job to be a reasonable transition as well. It’s actually not uncommon—a fair number of people will come out of business school and go into consulting because you get this broad business overview through a number of shorter projects at different companies. Then—after you get a sense of where you want to plug in longer—you leave the consulting firm and move into an operating role.

When did you first consider foregoing a residency in favor of a career in biotech?

I would say it happened during my 3rd and 4th year of medical school. After going back into the hospital after grad school, I was

(See Interview on Page 7 )

Biotechnology and Government: Alternatives to the Academic Route
Evan Noch, Temple University School of Medicine

We often hear that the MD/PhD degree leads us on a long and arduous journey into a successful career in academic medicine. A little time in lab, a little in clinic, a little teaching, and maybe even a little surgery—all of these ingredients are meant to add to our sparkling careers and cement our long-term dreams of being real-life physician-scientists. However, along this meandering course through our medical and scientific training, some of us may wonder if our end-goal is really to live in the often competitive, at-times murky world of academic medicine. In this age of alternative career options and with a new sense of ingenuity in career development, there are many other lesser-known paths available to young physician-scientists.

A recent study in Academic Medicine found that 67% of MD/PhD graduates are employed full-time in academic medical centers, while a much smaller percentage is employed at the NIH (4%) or in industry (8%). However, some of these other alternative career paths can be equally fulfilling and can, in some cases, offer a more realistic way of conducting true translational research. In recent years, the transformation of disease-oriented research from bench-side basic science to translational investigation and targeted drug development has attracted increasing numbers of physician-scientists to the biotechnology industry. The private sector is an appealing area for clinicians because of the need for clinical trial design and management as well as the potential to occupy heads of key divisions of companies. In addition, in a recent article of the Association of Professors of Medicine (APM) Physician-Scientist Initiative, Dr. Roger Perlmutter, MD, PhD, Executive Vice-President of Research and Development of Amgen, Inc., maintained that “because of their clinical background, physician-scientists are often best able to guide drug development and are, therefore, key players in industry’s overall mission.” Additionally, being an MD/PhD may be more worthwhile in industry than in academia. According to Dr. Steven Siegel, MD, PhD, Associate Professor of Psychiatry at the Uni-

(See Alternatives on Page 5 )
The Immortal Life of Henrietta Lacks by Rebecca Skloot is the biography of the most famous woman in science whom the world has never known. Ms. Skloot skillfully weaves the story of Henrietta Lacks with a description of the massive impact her eponymous HeLa cell line has had on biomedical research and medical ethics. The result is a thought-provoking treatise on the damage that can be done to patients and their families when tissues and medical records are used without proper consent. The book is a must-read for physician-scientists or anyone who has ever grumbled about the scrutiny of an Institutional Review Board.

For those who are unfamiliar with the story, Mrs. Lacks was treated for cervical cancer at Johns Hopkins Hospital in 1951. During the course of her treatment, a “dime-size” portion of cancer tissue was removed and transferred to the laboratory of a Hopkins tissue culture researcher. This tiny piece of tissue later became the HeLa cell line, the world’s first immortal human cell line. Although Ms. Skloot skillfully describes the scientific advances that were made possible by HeLa, the main character of her book is not the cells. Instead—and in contrast to nearly all previous texts on this subject—she focuses the narrative on Henrietta Lacks and the malignant impact that the cell line has had on her family.

Much of this malignancy resulted from a lack of clear communication between the scientific community and the working-class Lacks family. They had no knowledge of the existence of the HeLa cell line until 1971, nearly twenty years after Henrietta’s death. In that year, Henrietta’s husband was contacted by a Johns Hopkins postdoctoral fellow who was requesting blood samples from their children for use in HeLa research. Mr. Lacks—hard-of-hearing and with a fourth-grade education—misunderstood the fellow, thinking that she was holding his wife at Hopkins and had been doing experiments on her.

This and other missteps are used as a spring board for discussions about medical research ethics, including the Tuskegee syphilis studies, the Nuremberg Code (enacted in response to Nazi medical experiments) and the recently-settled case involving the misuse of DNA samples from the Havasupai Indians by researchers at the Arizona State University. Particularly relevant to this biotechnology-themed issue of Phi Psi, Ms. Skloot describes a case in which an oncologist used a patient’s leukemia cells to start a billion-dollar company without his knowledge. The incident became the basis of the landmark 1990 California Supreme Court decision Moore v. Regents of the University of California which determined that the patient had no right to proceeds acquired from his discarded tissue. This decision continues to reverberate in the

(See Immortal on Page 7)
Academic collaboration with industrial partners is increasing, particularly when commercializing a research finding. The New York Academy of Sciences recently advocated a move towards a more engaged model of partnership, where industry gets involved in pre-competitive scientific endeavors. As suggested in a Nature Immunology article from 2009, experiences of industry are many and diverse. Therefore I have developed three perspectives of working with industry: fictional, based upon short interviews with several academics, students, and those working in industry.

**Student Placements**

A student placement year in industry is increasingly common in the UK, providing the opportunity as a student to bridge the gap between the two worlds of research. Industrial placements can be valuable: not only do you gain intensive skills training in your individual research project, but you gain workplace experience.

One student came face-to-face with the differing priorities of industry, when his research program was deemed unsustainable and dissolved by the company, making him redundant. He was able to transfer to another company, but the speed and scale of the company’s decision left a lasting impression.

**Crossing the Void**

The Nature Immunology article goes some way to dispelling the myths around crossing the void to industry and back again. Working environments can be quite different: one scientist reported an experience similar to academia: from informal interaction between colleagues on different projects, to sharing reagents.

Science has to be tied to the development of the company, and therefore oriented towards profit. More consideration is given to starting new research programs, which can feel slower than in academia. However, once a program of research is started, the resources invested may dramatically accelerate progress – antibody development is a good example of this, where a lead candidate antibody may be generated just ten months after identifying a molecular target.

**Academic collaborations**

Collaboration between academic and industrial scientists is on the increase. The New York Academy of Sciences held a meeting this year to explore best practice in academic-industry collaboration. The meeting notes recommend both sides of science develop ties with each other through interaction at the personal and institutional level, to harness the best of both sectors.

Frictions may arise between the parties as a result of intellectual property generation. One academic reported industrial collaboration as a driver of good research practice; when working with industrial partners, lab records have to be kept in a systematic manner as copies of all lab books and notes are sent from the lab. Open communication is vital between the two parties and nothing can be missing in the scientific story.

If I were to summarize the advice from everyone I interviewed, it would be to gain as much experience as you can in either domain: industrial or academic. The dividing lines that have separated the two in the past are becoming blurred; therefore it will be increasingly important to understand both worlds and how they can work together.

*Thanks to all those I hassled with my dictaphone, particularly unsuspecting delegates at Neuroscience 2010.*

Alternatives (cont.)

At the University of Pennsylvania, “you can be competent across a broader range” and have more breadth in industry than a straight MD or straight PhD can be. However, since MD/PhD students receive little training in study design, interpretation, and analysis, he says, post-graduates who want to enter industry should be willing to go in and learn everything they can.

In the same way that we must understand the basic processes leading to ailments affecting our patients, understanding the fundamental steps involved in drug and product development are critical to success and advancement in industry. Nevertheless, as Dr. Perimutter stated in the APM publication, “there [can be] no substitute for content expertise, and assuming well-trained minds can conquer any discipline would be a mistake. Physic-ian-scientists need not be jacks of all trades; they should focus on questions relevant to patients.” It is this conscientious, clinically-oriented and focused approach in industry that portends success within the private sector.

While industry represents one alternative career path for physician-scientists, another viable option for MD/PhD trainees is to enter governmental agencies. For example, Dr. Chong Kim, a graduate of the Temple University School of Medicine MD/PhD program, serves as Clinical Assistant Professor of Urology at New York Medical College and Staff Attending Surgeon in the Division of Urology at Lincoln Medical Center. In addition to these appointments, he also works as Medical Officer at the Center for Drug Evaluation and Research at the Food and Drug Administration, where he oversees drug development.

Advantages to this type of career are increased job security, the ability to network and build professional connections, and the opportunity to make concrete significant contributions. Like industry, there is a steep learning curve when moving into a career at the FDA, and there is also the potential to stay current in terms of medical practice and science. On the other hand, whereas you may have a narrow focus in industry, a job at the FDA means a broader focus and the ability to keep your hand in many different pots, according to Dr. Kim. At the FDA, the goal of MD/PhDs is to advance science and medicine, but the twist is to ensure public health at the same time.

In terms of work-life balance and controllable lifestyles, there are clear benefits to industry and governmental employment. Jobs within these areas can be flexible, with the ability to design a schedule that fits your needs.

For example, Dr. Siegel conducts research and sees patients four days a week, spending one day a week in industry, while Dr. Kim operates and sees patients two days a week, spending three days a week at the FDA. Both agree that the way that you divide your time depends on your training background and the ability to negotiate your schedule. Salaries in these fields, which are often higher than those in academia, can also be negotiated and can often offset decreased patient loads. While jobs in industry can be fairly labile, the FDA may be more secure in terms of job security. On the other hand, according to Dr. Siegel, industry offers the opportunity to see the “fruits of your labor,” an aspect that is often missing in academia. Moreover, as grant funding continues to get tighter, industry and government positions may also become more appealing to young trainees.

Though there are benefits to entering industry, these advantages should not dissuade MD/PhD trainees from entering competitive residency programs. Rather, MD/PhDs should establish themselves in academia first and then make the leap over to industry or governmental departments at a high level. Otherwise, young physician-scientists may end up at a much lower level with considerably less ability to impact policy and development.

Though the majority of us will continue to enter academia and will envision that nearly perfect percentage divided between our patients and our labs, options exist that can provide interesting career alternatives. Industry and governmental positions offer intriguing possibilities to expand both clinical and research horizons, as well as potentially a more flexible lifestyle. However, decisions to enter these fields should be made according to individual career goals and with consideration of the benefits and drawbacks to each choice.

In this global world with an increased impetus to make large strides in our careers, we should know that our paths and destinations are in fact more numerous than ever.

President (cont.)

with the ASCI/AAP Joint meeting and will provide an ideal forum to hear from renowned speakers; network with both established physician-scientists and trainees; and present your research in intellectually stimulating, yet collegial, environment.

I also urge you to consider submitting an abstract for the Annual Meeting. Over 52 travel awards ($750) have been set aside to support your attendance at the meeting. Additionally, you will have the opportunity to compete for one of 6 poster awards ($1000) offered by APSA and ASCI/AAP. Lastly, selected abstracts will be chosen for oral presentations in front of both APSA and ASCI/AAP meeting attendees. Please note that the deadline for submitting your abstract for the APSA/ASCI/AAP Poster Session Travel Awards is January 7th, 2011. Lastly, I encourage you to frequently explore our website www.physicianscientists.org and our Facebook page for updated content. While many of our membership benefits are accessible through these routes, your Executive Council is in the process of identifying new resources for our members that will be posted throughout the year on these sites.

I wish you fruitful 2011 and I look forward to meeting many of you at our Annual Meeting in Chicago. In the meantime, please do not hesitate to contact me at christopher.alvarez-breckenridge@physicianscientists.org.
OPENING: DIRECTOR, CLINICAL RULES & QUALITY ASSURANCE

Job Title: Director, Clinical Rules and Quality Assurance
Company: Resolution Health (www.resolutionhealth.com)
Location: Columbia, MD
Reports To: Director of Clinical Affairs and Analytics

SUMMARY
Resolution Health, Inc. (RHI) sends personalized communications that empower patients and enable physicians to maintain health, improve quality of health care and reduce medical care cost. The Assistant Director, Clinical Rules and Quality Assurance will be responsible for: (1) identifying situations in which analyses of integrated health care claims data, lab test results and other member-specific health data (e.g., biometric or patient self reported data) can be used to identify actionable patient-specific opportunities to improve compliance with “best clinical practice” and prescribed medication regimens, and/or to responsibly reduce medical costs (for payor and/or member); and (2) assisting in the development and maintenance of technical specifications for computer algorithms used to identify such member-specific opportunities. The results of these analyses trigger personalized communications that are sent to members, providers, and other care managers.

ESSENTIAL DUTIES AND RESPONSIBILITIES include the following:
• Monitor development of clinical practice guidelines by major medical specialty organizations (e.g., ACC/AHA, ACG) as well as the creation and/or endorsement of quality measures by national committees (e.g., NQF, AQA, NCQA, AHRQ, USPSTF).
• Keep abreast of cutting edge activities in quality measurement, quality improvement, and disease management.
• Assist in the development, implementation and maintenance of the technical specifications for computer algorithms that (1) describe the clinical status of individual health plan members, including their overall health status, clinical history, the severity of particular diseases, and clinical and economic risk; (2) identify actionable opportunities to improve quality and safety of care and/or reduce cost of care. Technical specifications include the clinical logic and relevant codes used in medical service and prescription drug claims data; and (3) participate in quality assurance related to the performance of these algorithms.
• Ensure that the clinical algorithms used in RHI’s products and services are consistent with current clinical practice guidelines.
• Interact with health plan medical directors and external physician review panels that review RHI algorithms on a periodic basis.
• Work with internal staff and external clients as a primary resource for clinical inquiries.
• Assist with economic analyses to identify cost savings of health interventions. Other clinical and analytics projects as assigned by direct supervisor.

REQUIRED OR DESIRABLE EDUCATION/ EXPERIENCE
• Clinical: MD with at least two years of clinical experience.
• At least two years of experience doing health services research or work in quality improvement, disease management or utilization management.
• Familiarity with standard medical and pharmacy coding schemes (ICD-9, HCPCS, CPT-4, hospital revenue codes, LOINC, and NDC) and, ideally, experience analyzing health care claims data.
• Strong oral, written communication, organizational, and analytical skills.
• Ability to manage multiple, diverse projects in a fast-paced environment.
• Attention to detail.
• Experience using Microsoft office applications.

CONTACT INFORMATION
Please send/email cover letter and Curriculum Vitae (CV) to:
Tracy S. Joyner, Talent Acquisition Manager
tracy.joyner@wellpoint.com
(804) 354-3385

APSA Annual Meeting
April 15-17, 2011
Chicago, IL
Immortal (cont.)

current age of DNA and tissue banking by private companies and non-profit medical institutions.

Although Ms. Skloot provides well-researched and fascinating passages on the broad topics of biomedical research and medical ethics, her book truly shines in its most personal passages. Her years of close contact with the family allowed her to capture moments that would have been missed had she maintained a more conventional journalistic distance.

One of the most moving sections of the book is set in 2001, when Christoph Lengauer, a young Hopkins investigator who used HeLa in his research, invited the author and Henrietta’s two youngest children to his laboratory. During their visit, Dr. Lengauer showed them where the cells were stored, and let them look at HeLa under a microscope. He then sat down with them to explain basic cell biology and fielded all of the family’s questions. Remarkably, Lengauer was one of the first—if not the first—scientists to spend a substantial amount of time helping the family understand the biology and significance of HeLa. One wonders whether much of the pain endured by the Lacks family could have been averted had such a discussion occurred decades earlier.

As biomedical investigators, we have a great responsibility to reduce human suffering and disease through research in the clinic and laboratory. The Immortal Life of Henrietta Lacks reminds us of our equally important responsibility to preserve the dignity of the patients that make this research possible.

Interview (cont.)

really struck by the gap between cutting-edge science in the lab and where standard of care really stood in the clinic. I saw a rate-limiting step in the bench-to-bedside translation where we had lots of great ideas being published in good journals, but for some reason were not being picked up or actively developed in ways that could benefit patients directly. I became passionate about trying to understand these issues and hopefully become part of translating some great technology into improved treatments that could benefit patients in a clinical setting.

Did you have exposure to your career path prior to discovering that passion, or did you have to figure out how to get into that track on your own?

I would say it was much more the latter, and that is part of the reason that I am interested in this interview. I think it can be challenging sometimes to understand some of the options available to physician-scientist trainees. I was vaguely aware of a business aspect to new drug development that extended from the academic research process that I had been trained in. I did not know many details beyond a general idea that big pharmaceutical companies are involved in distribution, marketing and sales. At that point, I began reaching out to better understand how I could get involved in that career path.

What was the first thing you did to get from that vague sense of the availability of biotech opportunities to taking the first concrete step in that direction?

I started on the web by visiting a number of websites, including Genentech, Amgen and GlaxoSmithKline. I thought that I might just look at what kinds of jobs were available. I quickly realized that there is a lot of specialization in these big companies. It wasn’t enough to say that I was interested in life science business. I had to think about whether to do marketing, sales, finance, product development, clinical development, or bench research and it was actually very overwhelming. Eventually, I pulled back a little bit and thought about some alternative, broad steps that would generally move me in the right direction and not pin me to a narrow focus prematurely. What shook out of a lot of web-based research was that business school and management consulting were probably the two main approaches for someone coming from a technical background who was interested in moving into the business world.

There are many opportunities within the medical school curriculum. Unfortunately, there aren’t as many opportunities to explore alternative careers like biotech. Are you aware of any ways you can explore alternative careers in consulting or biotech while in medical school or graduate school?

My first recommendation would be to start asking questions about career goals as early as possible. Then—like in a lab setting—it keys up the next experiment. Once you ask the question early there are actually many opportunities to explore these careers. For example, the major consulting firms have summer internship programs. Another idea is to take a business school course. The last example that comes to mind would be the direct industry internships. I’ve found that in San Francisco or Boston—where there are a lot of biotech companies—it’s not uncommon for med students or grad students to take a couple of unpaid months to work in a biotech company. In addition to the experience you can also make a lot of contacts that will be valuable going forward. Given the timing of my career search process, I wasn’t able to take advantage of these opportunities and ended up having to make a calculated risk. I think at the end of the day there is an element of risk no matter what choice you make, but if you ask these questions early and test the waters I think you can make an informed decision.

How are physician-scientists uniquely equipped to be successful in biotech?

I think the overall message here is positive—good news. If you look at the world from the largest macro level, as far as you can pan out in Google Earth, there are two broad trends. One is specialization. As we grow in our knowledge as a human community, human limitations and the desire for efficiency drive a trend toward specialization and technical understanding. The second is the ability to be a connector and work at the intersection of different disciplines. I believe that physician-scientists can be very well suited along both of these broad trends. Just as there is no substitute for a rigorous PhD where you receive years of training in the lab, there’s no substitute for the training a physician-scientist is privileged to receive. It’s just not the kind of thing you can pick up in business school or on the weekends with the NY Times science supplement page. Secondly, physician-scientists by their nature are bridge builders, translating from the bench to the bedside but also working well with different kinds of people across disciplines. These skills are very much in demand in the marketplace because a combination of creativity and the ability to see connections is really the difference between some companies that can see opportunities and move into new markets and versus those that cannot and get left behind.
Francis Collins Rocks Out with APSA!