

## 2020 American Physician Scientists Association Presidential Address

# “Stop scaring the children”: a call for resilient and tenacious optimism

Abhik K. Banerjee

Welcome everyone to the 2020 Business Meeting of the American Physician Scientists Association (APSA). My name is Abhik Banerjee, and I serve as the 2019–2020 President for the organization. As you are aware because of the COVID-19 pandemic, we had been forced to cancel our 2020 Association of American Physician (AAP)/American Society for Clinical Investigation (ASCI)/APSA Joint Meeting at the Fairmont Chicago, originally scheduled on April 3 to 5, 2020. The safety of our membership is our top priority, and our organization is currently navigating through the aftermath of the cancelled meeting. Despite not being able to facilitate an in-person meeting for trainees of all stages of their physician-scientist career development, we are committed to continue to be the student physician-scientist's leading voice for improving educational opportunities, advancing patient-oriented research, and advocating for the future of translational medicine. In keeping with our organization's mission and based on several trainee requests, APSA has elected to provide Annual Meeting-related content online via the GoToMeeting platform over the originally scheduled weekend. Despite the rapidly changing public health crisis our country faces, our organization remains steadfast in our commitment to advocate for trainees' needs, and we hope you take advantage of the excellent programming our volunteers have coordinated over these next two days.

Over the past six years, I have had the privilege of volunteering with APSA, seeing initiatives grow and develop in parallel to my own graduate training experience. I vividly recall participating at my first Joint Meeting in 2014, anxious to present findings from my first laboratory rotation while

simultaneously cramming preparatory materials for my boards in between the keynote talks. Coming from a small program, I was surprised by the amount of collective support and camaraderie afforded by the tri-society meeting. I learned about new training opportunities and, importantly, for the first time in my training, did not feel alone. So easy it seems to fall into silos in the laboratory, without another peer or even a mentor to completely understand your career aspirations. It is not uncommon for physician-scientist trainees to be constantly questioned or challenged for their career path decisions, as many of those in the audience can attest.

Perhaps as a result of writing one too many grant applications for the organization over the past six years, I recall citing Dr. Wyngaarden's 1979 statement (and many derivatives thereof) that the physician-scientist is an endangered species (1–5). It is not terribly surprising — the training and career pathway suffers numerous challenges, including extended (and extending) training phases, attrition at almost every step, and lack of diversity, among other limitations (3, 6–9). Given these challenges over the past 40 years, I would ask: why has the physician-scientist not gone the way of the dodo?

Recognizing the unique challenges faced by physician-scientist trainees, APSA was established in 2003 by a group of trainees for trainees (10). Through continuous support from numerous partner organizations, including the AAP and ASCI, APSA has grown in scope and mission. Now in its 17th year, APSA represents over 2100 members from over 110 institutions across the country, with members ranging from undergraduate students to junior faculty members.

Over the past year, our organization has made progress on several key initiatives. First, APSA aims to support a diverse and robust physician-scientist workforce, and in 2018, we established a Diversity Ad Hoc Committee to develop programming to address the lack of representation within the training pipeline (11). With generous support from the Burroughs Wellcome Fund and in collaboration with several national organizations, including the American Medical Women's Association (AMWA), Building the Next Generation of Academic Physicians (BNGAP), the Clinician Investigator Trainee Association of Canada (CITAC), the Latino Medical Student Association (LMSA), and the Student National Medical Association (SNMA), among other partners, APSA hosted its first Physician-Scientist Trainee Diversity Summit in June 2019. The event employed human-centered design thinking with stakeholders from across the physician-scientist community to discuss best practices for recruitment, retention, and support for diverse investigators at all stages of their career development, and led to several publications (Figure 1 and refs. 12–14). Since the Diversity Summit, APSA's Diversity Ad Hoc Committee has made progress on multiple fronts, including developing a tool kit for local community engagement, coordinating multiple interactive sessions on imposter syndrome and diversity, and even creating a Twitter chat to follow up with outcomes discussed at the Summit (#DiverseDoubleDocs).

In addition to diversity, APSA also seeks to address the “leaky pipeline” of physician-scientist training: in particular, how involvement in academic research decreases as postgraduates enter specialty and subspecialty clinical training, with some individuals never returning to research over the remainder of their careers (3, 4). Barriers for postgraduate trainees to pursue research include insufficient time, funding, and mentorship while

Copyright: © 2020, American Society for Clinical Investigation.

Reference information: *J Clin Invest*. 2020;130(6):2733–2737. <https://doi.org/10.1172/JCI139537>.

This article is adapted from a presentation made during the 2020 APSA Virtual Annual Meeting, held on April 4, 2020.



**Figure 1. 2019 Physician-Scientist Trainee Diversity Summit.** Image of stakeholder participants from APSA's Physician Scientist Trainee Diversity Summit, held on June 21 and 22, 2019. Participants included representatives from the NIH, Burroughs Wellcome Fund, AAP, ASCI, and AAMC, as well as associate deans of diversity, dual-degree program directors, invited faculty speakers, and current trainees. APSA seeks to organize a follow-up conference in summer 2021.

balancing clinical responsibilities, and as such, the transition from resident/fellow to independence is an especially vulnerable time. Recognizing this particularly challenging time for trainees, APSA began a new Resident, Fellow, and Junior Faculty Committee in 2019. Since its inception, the Committee has developed new postgraduate programming for APSA regional meetings and the Annual Meeting, has coordinated an early career physician-scientist research value unit survey to ask how deans and department heads incentivize research and discernable outcomes on faculty retention, and is currently developing a prospective longitudinal study of graduating resident, fellow, and junior faculty to evaluate factors that facilitate research retention versus attrition.

Another “leaky” area of the physician-scientist training pipeline is the transition itself to postgraduate training (3, 4). With so many different specialty and subspecialty training options available, including programs with or without protected research time or research tracks, and due to the lack of a clear definition of what a postgraduate Physician-Scientist Training Program (PSTP) is, APSA recognized the need for a consolidated source of information for applicants and took the lead to develop a research track res-

idency wiki in 2015. Since that point, we have strengthened our relationship with PSTP and Research in Residency (RIR) directors by participating in annual discussions at the Alliance for Academic Internal Medicine (AAIM) Research Pathways Directors Workshops and the Association of American Medical Colleges (AAMC) Graduate Research, Education and Training (GREAT) meetings, as well as hosting a well-attended Research Residency Directors’ Meeting at our Annual Meeting (15). There is still huge demand for resources and information related to these training pathways (Figure 2). To address this, over the past year we have established an interactive session series focused on applying to training programs within internal medicine and pediatrics, with upcoming sessions planned for surgery and psychiatry. We are continuing to work closely with the AAMC and partner organizations, including the Society for Pediatric Research (SPR), to increase transparency for the postgraduate physician-scientist program application process and to facilitate transitioning to this next stage of training.

APSA also expanded its ongoing programming over the 2019–2020 year, including supporting six regional meetings and three diversity professional networking events across the country. Highlighting

a few examples, our 2019–2020 Undergraduate Mentorship Program had record participation, with over 458 mentors and 554 mentees (72.6% women, 38.2% underrepresented minorities, and 32.1% first-generation college students) (Figure 3). With generous support from Burroughs Wellcome Fund and the Doris Duke Charitable Foundation, we raised funds to support travel for eight mentees to participate in the 2020 Annual Meeting prior to the COVID-19 pandemic. In addition to our mentorship program, we recognize the diversity of our membership, the diverse interests of our membership, and the diverse paths to becoming a physician-scientist, and have established new partnerships with several professional societies, including Research!America, the American Association for Dental Research, and Medical Student Pride Alliance, among others. As a final highlight, we conducted an IRB-approved study examining the prevalence and perception of efficacy of clinical continuity strategies used by different dual-degree programs during graduate training. We are excited to share some of the results of this study later in this Business Meeting. As pointed out in last year’s address, this study was born from an APSA Institutional Representative’s (IR) request to learn about best practices from other



**Figure 2. Physician-Scientist Training Program/Research in Residency (PSTP/RIR) question-and-answer panel from the 2019 AAP/ASCI/APSA Joint Meeting.** APSA-coordinated question-and-answer panel between prominent PSTP/RIR directors and trainees at the 2019 AAP/ASCI/APSA Joint Meeting. The panel grew to standing room only and caused meeting organizers to make accommodations for multiple parallel question-and-answer sessions during the 2020 Joint Meeting prior to COVID-19 meeting cancellation. APSA will continue to facilitate communication between research-integrated postgraduate programs and trainees to improve the transparency of the application process.

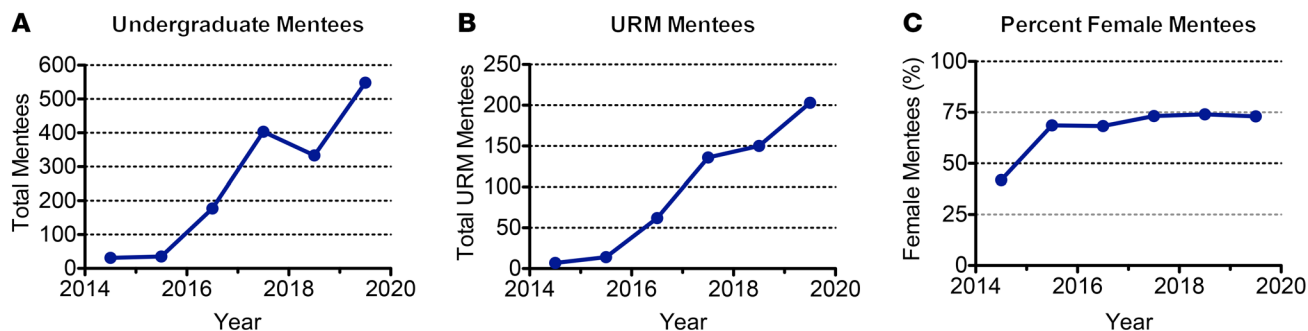
trainees across the country (11). To the IRs in the audience, I will comment that your voice is respected and heard. APSA was established by trainees for trainees, and we will follow through. You are not alone. APSA is here to help.

To the crux of this address, why has the physician-scientist not gone extinct? While I do not mean to belittle the importance of government, philanthropic, and educational interventions by not exhaustively listing each and every one of them,

I would instead focus my argument on the theme of resiliency (8, 9). Integral to resiliency, or the ability to confront setback and recover, is optimism, and I would argue that successful physician-scientists are, by definition, optimists. Physician-scientists employ the scientific method to improve the health outcomes of the global community, and despite setback after setback after setback, continue to follow this pathway for the sake of their patients' quality of life. Though they acknowledge the com-

plexity of challenges in front of them, they are continuously willing to engage and confront these challenges because of the core belief that with time, effort, and luck, challenges can be overcome.

Physician-scientists are also willing to help and support one another. Recently, our organization reapplied for NIH R13 grant funding, specifically to support travel funds for trainees from underrepresented backgrounds to attend the 2021–2025 Joint Meetings. Given the amount of mov-



**Figure 3. Record participation in the APSA Undergraduate Mentorship Program.** APSA Undergraduate Mentorship Program Mentee demographic information from program inception through the 2019–2020 cohort. Demographic information includes total mentees (A), percentage of mentees self-identified as from underrepresented minority backgrounds (B), and mentees self-identified as female (C). Figure adapted with permission from data presented in Fox et al. in the *JCI* (22).



**Figure 4. 2019–2020 APSA Executive Council.**

Image of 2019–2020 APSA Executive Council and Board of Directors from the organization's leadership retreat on July 13 and 14, 2019. Front row (left to right): Abhik Banerjee, Sarah Groover, Jose Rodrigues, Moshe Levi, Evan Noch, and Omar Toubat. Second row (left to right): Aylin Rodan, Lillian Zhang, Gina Calco, Eileen Hu, Elinor Mannon, Chu Hsiao, Christopher Williams, and Robinna Lorenz. Third row (left to right): Trevor Hunt, Samantha Spellicy, Christopher Sylvester, Aaron Sandoval, and Kofi Mensah. Back row: Alex Waldman.

ing parts for the application, I reached out to representatives from ASCI and AAP leadership, as well as members of our own Board of Directors, for support. Despite their busy schedules, every single individual I contacted without hesitation provided support for our application, from letters of support to fully reviewing multiple iterations of our entire grant application. Whether it was out of a desire to mentor trainees or out of particular support for our grant application's purpose, physician-scientists have an often understated willingness to help and address challenges bigger than them.

Concluding, from the discovery of the LDL receptor based on a striking clinical observation to the development of a highly specific small-molecule inhibitor of chronic myelogenous leukemia and the development of the first human gene therapy treatment for inherited retinal degeneration and other discoveries too numerous to state, physician-scientists have pushed our understanding of human disease and have led the charge towards precision and targeted treatment (16–20). As future physician-scientists in the era of CRISPR/Cas9 targeting, modern computing, and numerous other advances in technology, you are training and will practice in the most exciting era of biomedical research human-

ity has ever seen, and as the COVID-19 pandemic illustrates, physician-scientists are needed now more than ever (21). To respond to the words of a senior investigator, I ask the field to stop scaring the children, be tenacious, stand firm, and be boldly optimistic despite adversity. To be a physician-scientist is to be a resilient optimist, that with time, effort, collaboration, and advances in technology and our understanding of biology and the human experience, patient health outcomes can and *will improve*.

On behalf of the APSA Executive Council, I welcome you to the 2020 APSA Business Meeting and the 2020 Virtual APSA Annual Meeting (Figure 4). Thank you.

### Acknowledgments

AKB is supported in part by a National Heart, Lung, and Blood Institute Fellowship F30HL136080. He is very grateful to Sarah Groover, Hannah Turbeville, Dibya Banerjee, and Debashree Banerjee for review of this manuscript. He acknowledges the work of Jose Rodrigues, Jennifer Kwan, Evan Noch, and Erin Wiedmeier on various 2019–2020 APSA initiatives featured in this article and also acknowledges Omar Toubat, Christopher Williams, and Brandon Fox for permissions to adapt figures for this manuscript.

APSA is thankful for support from the Burroughs Wellcome Fund, the Doris Duke Charitable Foundation, and the Lasker Foundation, as well as for continuous support from the ASCI and the AAP.

Address correspondence to: Abhik K. Banerjee, California Institute of Technology, 1200 E. California Blvd., MC 156-29, Pasadena, California 91125, USA. Phone: 626.395.1222; Email: abhik.banerjee@physicianscientists.org.

1. Wyngaarden JB. The clinical investigator as an endangered species. *N Engl J Med*. 1979;301(23):1254–1259.
2. Wyngaarden JB. The clinical investigator as an endangered species. *Bull N Y Acad Med*. 1981;57(6):415–426.
3. Williams CS, et al. Training the physician-scientist: views from program directors and aspiring young investigators. *JCI Insight*. 2018;3(23):125651.
4. Milewicz DM, Lorenz RG, Dermody TS, Brass LF, National Association of MD-PhD Programs Executive Committee. Rescuing the physician-scientist workforce: the time for action is now. *J Clin Invest*. 2015;125(10):3742–3747.
5. Jain MK, Cheung VG, Utz PJ, Kobilka BK, Yamada T, Lefkowitz R. Saving the endangered physician-scientist - a plan for accelerating medical breakthroughs. *N Engl J Med*. 2019;381(5):399–402.
6. Physician-Scientist Workforce Working Group, NIH. Physician-Scientist Workforce (PSW) Working Group Report. [https://acd.od.nih.gov/documents/reports/PSW\\_Report\\_](https://acd.od.nih.gov/documents/reports/PSW_Report_)

- ACD\_06042014.pdf. Updated June 1, 2014. Accessed April 29, 2020.
7. Zemlo TR, Garrison HH, Partridge NC, Ley TJ. The physician-scientist: career issues and challenges at the year 2000. *FASEB J*. 2000;14(2):221-230.
  8. Ley TJ, Rosenberg LE. Removing career obstacles for young physician-scientists -- loan-repayment programs. *N Engl J Med*. 2002;346(5):368-372.
  9. Ley TJ, Rosenberg LE. The physician-scientist career pipeline in 2005: build it, and they will come. *JAMA*. 2005;294(11):1343-1351.
  10. Nguyen FT. The birth of the American Physician Scientists Association — the next generation of Young Turks. *J Clin Invest*. 2008;118(4):1237-1240.
  11. Iness AN. Waiting to “make it” versus “making it happen”: empowering physician-scientists in training [2019 American Physician Scientists Association Presidential Address]. *J Clin Invest*. 2019;129(12):5062-5065.
  12. Christophers B, Gotian R. Using admission statistics to encourage diverse applicants to MD-PhD programs. *J Clin Invest*. 2020;130(1):17-19.
  13. Turbeville H, Gotian R. Put participants first in conference design [guest column]. *Nature*. <http://www.nature.com/articles/d41586-019-02759-2>. September 12, 2019. Accessed April 30, 2020.
  14. Groover S, Gotian R. Five ‘power skills’ for becoming a team leader. *Nature*. 2020;577(7792):721-722.
  15. The GREAT Group. *Advancing Biomedical Research Training*. Washington, DC, USA: Association of American Medical Colleges; 2014.
  16. Goldstein JL, Brown MS. The clinical investigator: bewitched, bothered, and bewildered—but still beloved. *J Clin Invest*. 1997;99(12):2803-2812.
  17. Goldstein JL, Anderson RG, Brown MS. Coated pits, coated vesicles, and receptor-mediated endocytosis. *Nature*. 1979;279(5715):679-685.
  18. Deininger MW, Druker BJ. Specific targeted therapy of chronic myelogenous leukemia with imatinib. *Pharmacol Rev*. 2003;55(3):401-423.
  19. Acland GM, et al. Gene therapy restores vision in a canine model of childhood blindness. *Nat Genet*. 2001;28(1):92-95.
  20. Bennett J. My career path for developing gene therapy for blinding diseases: the importance of mentors, collaborators, and opportunities. *Hum Gene Ther*. 2014;25(8):663-670.
  21. Xiong X, Chen M, Lim WA, Zhao D, Qi LS. CRISPR/Cas9 for human genome engineering and disease research. *Annu Rev Genomics Hum Genet*. 2016;17:131-154.
  22. Fox BM, Adami AJ, Hull TD. Reinforcing our pipeline: trainee-driven approaches to improving physician-scientist training. *J Clin Invest*. 2018;128(8):3206-3208.