Academic Anesthesia: Innovate to Avoid Extinction

To the Editor:

Todd and Fleisher editorialize that the field of anesthesia has an upcoming problem of few anesthesia trainees choosing to pursue academic careers.[1] They admonish that this trend would result in a slowing of creativity and creation that would ultimately lead to "professional extinction." When commenting on the recent study by Sakai *et al.*,[2] they accurately suggest that two problems exist when thinking about this troubling situation for our specialty: (1) incentives and (2) the measured outputs of academic endeavors. However, both of these issues require additional comment.

When thinking about extinction, we must remember that extinct species are the ones that did not adapt to the stress and threats of their changing environment. If we are truly worried that our specialty lacks academic and creative pursuits, we must identify the changes in our environment and adapt our academic pathways to accommodate these changes.

For the millennial generation, the academic environment has new challenges that were not faced by those who have trained us. Today, medical residents are growing up in a world where creative success is modeled by novel innovation, where individuals have taken untraditional paths and have committed themselves to an ambitious and disruptive vision of the future (*i.e.*, the young founders of Facebook, Google, and YouTube). These are individuals whose untraditional pathways, which began with ideas cultivated in university environments, ultimately led to change within an entire sector and personal success for these founders. This is the road that excites and constitutes success for the millennial generation. However, academic medicine continues to exist in an environment with greater resistance and significant barriers to pursue disruptive endeavors within the university. For example, there are fewer National Institutes of Health research dollars for investigators to obtain*† to pursue innovative ideas and decreased success rates for investigator applications (fig. 1), which ultimately makes the road to academic tenure (a large professional incentive) much more difficult to attain. In addition, there is a widening gap between successful research applications between new and experienced investigators.‡ Today, academic departments are both more reluctant to financially partner with nonfederal funding agencies and lack the finances for clinical support that our predecessors relied upon to advance their scholarship. Furthermore, many academic centers' promotion pathway continues to emphasize a proscribed, incremental, process that promotes risk aversion, failure avoidance, and reluctance to engage in new or disruptive thought. Simultaneously, there is an increasing chasm between academic and private practice financial compensation. These issues expose large opportunity costs to choosing academic careers and a disincentive to pursue academic medicine.

What incentive do the anesthesia residents of the millennial generation need to align with academia? Young anesthesiologists need to view academic anesthesia departments as "incubators for innovation" in our field. Academic anesthesia departments should organize themselves along bold agendas for innovation centered around all aspects of the perioperative period that challenge the status quo and expand the scope of our field. Innovation for lofty agendas will require a combination of basic science, new drug discovery, systems engineering, and the design of new care delivery models.

Academic departments should design its scholarship tracks to allow groups of residents or junior faculty to lead large-scale projects of their own from an early stage. Junior faculty need to have the ability and the opportunity to fail at a project, and fail early. This prevents young academics from just "doing things the way they have been done," to increase the publication numbers to advance through the academic ranks. Junior faculty need to see expansion and application of their work into the private market in the form of patents and start-up companies, as well as retain some ability to have individual ownership or equity in their creative enterprise. We need to see departments fund individual project ideas that will ultimately be a conduit to professional or financial success. In the business sector, innovation is a focused and deliberate investment strategy to introduce new revenue streams to an organization. Similarly, academic anesthesia departments should fund ideas that, ultimately, will generate new recurrent revenue for the department. This model would emulate the success of the iPhone and Facebook app courses in Stanford University's undergraduate computer science department where the University courses serve as the platforms from which new apps are made and sold, revenue is generated to fund the course itself, and new companies form—all simultaneously promoting the success of its students.[3]

Finally, deliverables for academic productivity should continue to emphasize modern outputs of creative contributions beyond printed peer-reviewed journal articles including educational online videos, mobile apps, software, devices, companies, patents, Web sites, and new services that are capable of being sold in the private market. This transition to focus on modern deliverables combined with inspiring agendas for innovation in anesthesia will capture

* $21.5 billion budget in 2014 *versus* $20.1 billion in 2013 and increasing cuts are expected with 2014 budget sequestration.

† Applications, awards, success rates, and total funding by Institute/Center, mechanism, activity code, and funding sources, National Institutes of Health Data Book. Available at: http://report.nih.gov/success_rates/index.aspx. Accessed February 22, 2014.

‡ Success rates and funding rates R01-equivalent grants new (type 1): Success rates by career stage of investigator, National Institutes of Health Data Book. Available at: http://report.nih.gov/NIH-Databook/Charts/Default.aspx?showm=Y&chartId=136&catId=13. Accessed February 22, 2014.

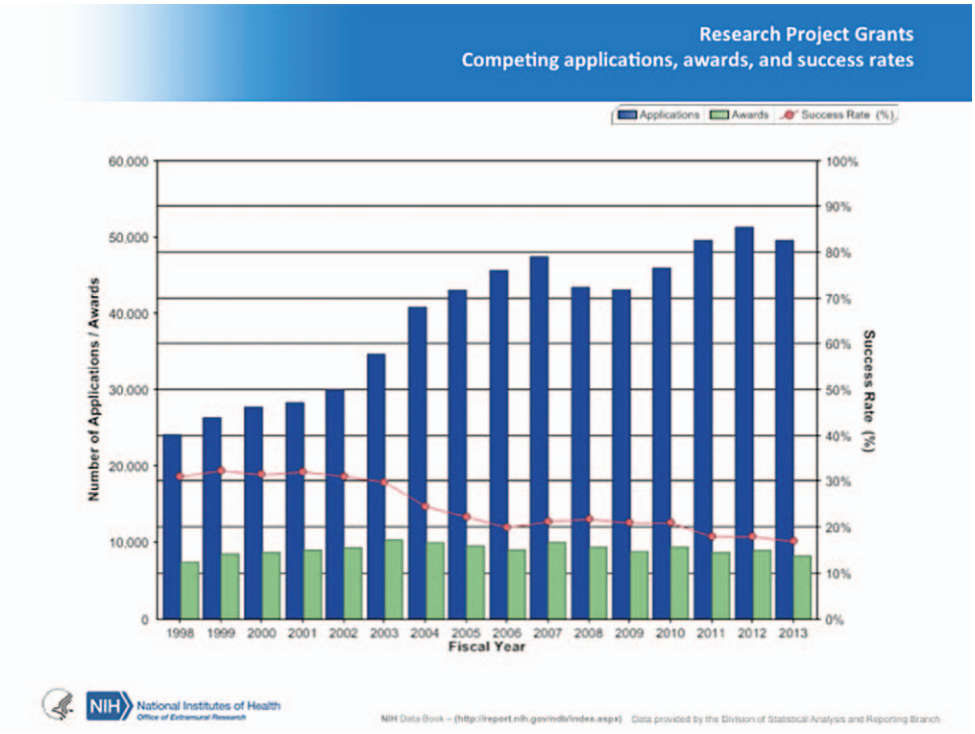

Fig. 1. National Institutes of Health Data Book. This figure is publically available at http://report.nih.gov/NIHDatabook/Charts/Default.aspx?showm=Y&chartId=124&catId=1 and permission to reproduce is not required.

the imagination of and become a magnet for the incredible talent base of medical students who, today, choose to pursue a career in anesthesiology.

The stable epoch of academic Pangea is slowly coming to an end. Tectonic shifts are starting to occur and extinction is bound to happen. Academic anesthesia departments need to make a clear decision whether to be platforms for innovation and adaptation, which will attract the creative minds who will shape the future of the field, or succumb to the tectonic shifts in healthcare labor economics that are sure to occur in the near future.

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Competing Interests

The authors declare no competing interests.

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3. Miguel H: The class that built apps and fortunes. The New York Times, May 7, 2011

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In Reply:

We would like to thank Drs. Kamdar and de Gialluly for their thoughtful comments concerning our editorial.[1] It is heartening to hear from two members of our newest generation. They note "that extinct species are the ones that did not adapt to the stress and threats of their changing environment." They are exactly correct—although we hope that one of the messages in our editorial was that we—as a profession— MUST ADAPT if we are to survive. We would argue that the program described by Sakai *et al.*[2] is, in fact, one department's effort to do just that.

They then go on to succinctly spell out some of the challenges that face new entrants to academic medicine: reduced National Institutes of Health dollars, bureaucratic obstacles, shrinking clinical revenues (which make it difficult for departments to provide the "startup" funds for young investigators), enormous time pressures (which are a direct consequence of falling clinical revenue *vs.* the cost of delivering care), and perhaps a changing vision of