

# Update

Summer 2017

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## President's Panel: Hypoxia is Not Always Bad for You?



*Jeanine P. Wiener-Kronish, MD  
President, AUA  
Harvard University  
Cambridge, Massachusetts*

It was quite befitting to honor the AUA focus member, Warren Zapol, MD, PhD, Harvard University, Massachusetts General Hospital, with a Panel on Hypoxia. The AUA Editor (LWF) has taken the liberty to choose three invited experts to provide their commentary on the President's Panel, moderated by AUA President, Jeanine P. Wiener-Kronish, MD, PhD.

### Commentary on President's Panel: *Oxygen and Humans: The Good, The Bad and The Ugly?* by Michael Grocott, BSc, MBBS, MD, FRCA, FRCP, FFICM

*David Polaner, MD  
Children's Hospital Colorado  
Aurora, Colorado*

Prof. Michael Grocott (University of Southampton, England) addressed the conference in a talk entitled "Oxygen and Humans: The Good, The Bad and The Ugly." Prof. Grocott, a prominent anesthesiologist and intensivist, is also renowned as the director and principal investigator of the Caudwell Xtreme Everest project, which conducts high altitude physiology and medical research at the extremes of human survival in the austere hypoxic environment of the Himalaya and the high Alps. Many of the findings of this ongoing series of field and laboratory studies are applicable to patients who suffer from hypoxia due to medical conditions such as acute lung injury.



Prof. Grocott began by introducing the audience to some of the basics of high altitude physiology and how humans are able to adapt to a profoundly hypoxic environment, an environment that without the compensatory mechanisms that take place over time, such as hyperventilation, shift in 2,3 DPG, increased red cell mass, respiratory alkalosis, etc., would lead to a very rapid loss of consciousness followed by death in unacclimatized subjects. At extremely high altitudes the acclimatized subject will have a  $paO_2$  of less than 30mmHg and  $PaCO_2$  of only single digits or low teens, yet due to these adaptive physiologic mechanisms they are able to maintain tolerable oxygen saturation levels and athletic performance. Amazingly, lactate levels at rest, while elevated over sea level values, indicate that metabolism remains primarily aerobic despite the profound degree of arterial hypoxia.

Not all subjects, of course, are able to adapt effectively, and various maladies are precipitated by hypobaric hypoxic environments when adaptation is either not effective or produces exaggerated physiologic effects. Conditions such as high altitude pulmonary edema and high altitude cerebral edema are mediated through vascular impairments involving hypoxic pulmonary vasoconstriction, effects on pulmonary perfusion pressures and right heart function, abnormalities in transepithelial sodium flux, and imbalances in tissue perfusion. Some determinants of effective adaptation appear to be under genetic control, and these factors are still under active investigation.

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# President's Panel: Hypoxia is Not Always Bad for You?

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## Commentary on President's Panel: Hypoxia and Damaged Mitochondria: Good News by Vamsi K. Mootha, MD

Philip G. Morgan, MD  
University of Washington  
Seattle, Washington



Mitochondrial disease (MD) is recognized as an important cause of a wide range of physiologic changes, often very severe. It is increasingly common for children with mitochondrial disease to undergo surgery and anesthesia. While many different anesthetics have been used successfully for these patients, serious, unexpected complications have occurred during and following anesthetic exposure. This has led to the widespread opinion among anesthesiologists that mitochondrial patients are at increased risk from the stress of surgery and anesthesia.

The most common pediatric mitochondrial disease is Leigh syndrome, which presents within the first few years of life as a subacute neurodegeneration often leading to death. There are no proven treatments although supportive care with supplements is commonly used. In 2016, work from the laboratory of Dr. Vamsi Mootha showed that the healthspan and lifespan of a mouse model for Leigh syndrome (the *Ndufs4*(KO) mouse) was dramatically improved by exposure to continuous hypoxia. Conversely, exposure of these mice to moderate hyperoxia (55%), levels ordinarily well tolerated by healthy mice, led to rapid demise of these mice within days.

At the 2017 AUA meeting in Washington DC (and published within a month in the Proceedings of the National Academy of Sciences), Drs. Mootha and Zapol and colleagues further explore the preclinical potential of hypoxia in the same mouse model. They found that more moderate hypoxic regimens – such as continuous 14% or 17% -- were insufficient. They also found that intermittent 11% hypoxia was insufficient. Hence only continuous, 11% hypoxia appears effective. However, what was very exciting was the finding that treatment with 11% oxygen reversed much of the histological and behavioral CNS changes when treatment was started relatively late in the disease progression. Dr. Mootha urged that while exciting, additional preclinical mouse studies and human safety studies in healthy individuals would be required before moving this concept into patient care.

A lively post-seminar discussion centered around the use of oxygen in the operating room for patients with documented mitochondrial disease. While no studies in human patients have been done, Dr. Mootha suggested that perhaps caution should be exercised in the use of hyperoxic mixtures in patients with mitochondrial disease when supplemental oxygen is not indicated for other reasons. He urged the need for retrospective and prospective studies in this area.

## Commentary on President's Panel: Mitochondrial Disorders: Towards a Therapy from Thin Air by Lorenzo Berra, MD

Philip Bickler, MD, PhD  
University of California at San Francisco  
San Francisco, California



Dr. Lorenzo Berra's presentation about hypoxia therapy in hospitalized patients was a provocative extrapolation of recent developments suggesting that for some patients, and for some conditions, mild hypoxia might be beneficial. This seemingly paradoxical conclusion is of course in opposition to conventional clinical wisdom about always avoiding hypoxia, and the assumption that if oxygen is good, more oxygen is better.

The modern study of hypoxia's effects on humans can be traced to the disaster aboard the high-altitude balloon Zenith, in the year 1874. In that mishap, three intrepid Parisian balloonists ascended to about 8000 meters; all lost consciousness and two died. The great French physiologist Paul Bert explained that hypoxia was the culprit in the deaths, a result of decreased barometric pressure with altitude. Since the Zenith, thousands of research studies have chronicled human disease and adaptation to hypoxic environments. In about 60% of healthy humans, ascent to above 10,000 feet (saturation of about 88%) causes acute mountain sickness, with headache, sleep disturbance, GI disturbance, and malaise. Therefore, it was not surprising to hear of similar symptoms reported in Dr. Berra's healthy subjects in the hypoxia room at Massachusetts General Hospital. These symptoms are unpleasant, but abate with time (acclimatization), and only rarely result in pulmonary edema or cerebral edema.

The suggestion that hypoxia has health benefits has a long history, but little real data supporting it. As far as we know, residents of high altitude suffer the same diseases and have similar (or even shorter) lifespans than comparable populations at sea level. At the same time, chronic mountain sickness, seen in about 7% of long-term residents at high altitude, creates significant disability that includes pulmonary hypertension, polycythemia, right heart failure, sleep apnea and a high 5-year mortality.

The evidence is clear that healthy people tolerate hypoxia, and that adaptation is effective. But hypoxia in patients, who are older and sicker than those ascending to altitude on climbing expeditions, will be fraught. We may find that healthy adaptation to hypoxia is blunted in ill patients, and that hypoxia therapy is restricted to those with unusual conditions, such as mitochondrial disorders. Simple avoidance of unnecessary hyperoxia may be the safer and more impactful alternative in clinical care.

# Retired Member Category Reinstated

AUA believes it is important to keep retired members in the community. With so many AUA members retiring, the AUA Council thought it was important to reinstate a Member Emeritus category for retired members.

AUA members retiring or retired have spent many years committed to the advancement of the AUA mission.

The Council recommended amending Article III of the Bylaws by reinstating the senior member type with the new name: Member Emeritus.

A majority of the active members voted to approve the amendment at the end of June.



## Amendment to Article III Bylaws

### 3.14 Member Emeritus

**3.141** A member who has been an Active Member for ten years or more, and who has retired from a faculty position in anesthesiology in a medical school or its affiliated teaching hospital, shall have the option to continue as an AUA Member Emeritus upon request.

**3.142** Member Emeritus may enjoy all the privileges of active membership except those of voting, holding office, and paying dues.

**3.143** It is understood that Member Emeritus, as retired faculty who will no longer pay AUA dues, should not be compensated for full time services (regardless of Emeritus or other status) by a medical school, affiliated teaching hospital, or other employer.

[Click here](#) to review the full AUA Bylaws.



More photos from the AUA 64th Annual Meeting [here](#).



## AUA 64<sup>th</sup> Annual Meeting

# Scholars' Program Summary from Annual Meeting 2017



Sinziana Avramescu, MD,  
PhD, FRCPC  
University of Toronto  
Toronto, Ontario, Canada



Katie J. Schenning, MD, MPH  
Oregon Health and  
Science University  
Portland, Oregon

The 2017 joint AUA/IARS meeting featured the second annual **Scholars' Program**, an energizing series of talks directly targeted to the needs of early-career scientists in anesthesiology at any stage, from medical students through junior faculty. This cross-disciplinary program spanned the spectrum from career development advice to expert opinions on the scientific future of our specialty. Instead of dividing into narrow subject-focused research silos, the **2017 Scholars' Program** brought early-career researchers together to meet and join a community of individuals passionate about advancing anesthesiology science and committed to pushing the field of anesthesiology into the future. Welcoming and engaging to all interested scholars, the **2017 Scholars' Program** provided a comfortable format for connection and mentorship and was heavily attended by senior academic anesthesiologists committed to supporting **early-Stage Anesthesiology Scholars (eSAS)** in their career and scientific development goals. Registration for this program quickly filled, demonstrating this program's relevance to members of our specialty: over 100 Scholars and senior faculty registered for this second annual Scholars' Program. We are excited to share the highlights of the sessions for the AUA membership!

Drs. George Mashour and Michael Avidan welcomed everyone to the **2017 Scholars' Program**, and they spoke passionately about the importance of supporting the young anesthesiology scholars and about our specialty's novel initiatives to nurture junior investigators. Even in this challenging funding climate, Drs. Mashour and Avidan successfully competed for funding via an R13 mechanism funded through the National Institute of General Medical Sciences (NIGMS) of the NIH to support the scientific mission of **eSAS**, and future Scholars' Programs at upcoming IARS Meetings. They highlighted the need for collaborations across disciplines and institutions and the importance of outreach into the community; these efforts will bring anesthesiology research into alignment with the collaborative atmosphere which continues to advance medicine and health as a whole. Under the mentorship of Drs. Mashour and Avidan, the **eSAS** members were deeply involved in coordinating programming, inviting speakers, and moderating the sessions.

Drs. Elizabeth Whitlock and Vivianne Tawfik, **eSAS** co-presidents, introduced the mission and goals of the **eSAS**. **eSAS** ([esashq.org](http://esashq.org)) is composed of early-career anesthesiologist-scientists and scholars interested in academic anesthesiology and in advancing the science of anesthesiology. The mission of **eSAS** is to serve as an academic home for developing scholars in anesthesiology. The goal of **eSAS** is to support and facilitate the retention and maturation of anesthesiologist-scientists by expanding opportunities for peer and senior mentorship and scientific collaboration, improving the visibility of important research performed by early-career anesthesiologists, and organizing targeted seminars about career and scientific opportunities within and beyond anesthesiology research.

The Keynote Session, *Rigor and Reproducibility Across the Translational Spectrum*, featured the Immediate Past Editor-in-Chiefs of the leading anesthesia journals, Dr. James C. Eisenach for *Anesthesiology* and Dr. Steven L. Shafer for *Anesthesia & Analgesia*. Dr. Eisenach, Professor of Anesthesiology, Physiology and Pharmacology at Wake Forest School of Medicine, and President of the Foundation for Anesthesia Education and Research (FAER), was concerned about the lack of rigor and transparency in preclinical research. Using examples, he explained that many studies contain conscious and unconscious biases and data that cannot be replicated or reproduced. Dr. Shafer, Professor of Anesthesiology, Perioperative and Pain Medicine at Stanford University, also described a real reproducibility crisis in scientific research. He gave numerous examples of statistical tests used inappropriately and resulting in misleading results and conclusions. Both Drs. Eisenach and Shafer encouraged the scientific community to strive to increase the quality and transparency of published scientific data.

The first Plenary Session, *Expanding our Horizons in Anesthesiology Research Training*, began with a presentation from Connie Chang, MBA, who is the Managing Director of Fast Forward Medical Innovation at the University of Michigan Health System. Ms. Chang used examples from the Early Technology Development Course at the University of Michigan to enlighten the audience about unique characteristics of biomedical commercialization as it relates to biomedical researchers. She encouraged scholars to reach out to her to discuss the process for developing and implementing an Early Technology Development Course at their home institutions. The second speaker was Dr. Paloma Toledo, Assistant Professor of Anesthesiology, Northwestern University Feinberg School of Medicine, who presented on the challenges of building diversity in academic anesthesiology. She presented sobering statistics regarding women and underrepresented minorities among leadership roles in academic anesthesiology from department chairs to the leadership of the American Society of Anesthesiologists.

Attendees were deeply inspired by the lunch session, *Inspirational Tales of Career Success*. Drs. Oluwaseun Johnson-Akeju, and Jesse Ehrenfeld, two rising stars in academic anesthesiology, candidly described their individual

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# Scholar's Program Summary from Annual Meeting 2017

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career trajectory success stories. Scholars frequently have great challenges in the transition from a resident/fellow anesthesiologist to an accomplished academic faculty physician. This novel approach to peer mentorship left Scholars feeling inspired and empowered, and highlighted that there are a multitude of ways to define a successful academic career.

The meeting's location in Washington D.C. afforded the unique opportunity to invite NIH representatives for the *NIH Funding for Transition to an Early Independence* information session. Dr. Alison Cole, Branch Chief of the Pharmacological and Physiological Sciences Branch of the Division of Pharmacology, Physiology, and Biological Chemistry of the NIGMS, began the session describing funding opportunities for early-career investigators at the NIGMS. Dr. Luci Roberts, Program Director of the Behavioral & Systems Neuroscience Branch in the Division of Neuroscience of the NIA described special funding opportunities specific to early-career scientists at the NIA. They both gave advice regarding how and when to reach out to program officials, and the benefits to using tools such as the recently redesigned NIH Training Page, the Center for Scientific Review "Meet the Experts" Webinars, and the Matchmaker tool of the NIH RePORTER.

In the second Plenary Session, *Precision Medicine: What Anesthesiology Can Contribute*, we learned about the national precision medicine initiative and how it relates to pharmacogenomics and big data. Dr. Debra Schwinn, Associate Vice President for Medical Affairs and Professor of Anesthesiology, Pharmacology and Biochemistry at Carver College of Medicine, Iowa, spoke about her leadership in the field of perioperative pharmacogenomics and discussed future opportunities in this area of research. Dr. Sachin Kheterpal, Associate Professor of Anesthesiology at the University of Michigan, who has been part of the team that laid the groundwork for President Barack Obama's Precision Medicine Initiative, talked about his work with big data. He discussed the use of electronic health records data to support perioperative research and improve patient safety and the quality of care. Both panelists talked about data sharing, transparency and the importance of building strong research collaborations.

Scholars were also enthusiastic about the intimate environment and targeted advice shared during the *Mentor-Trainee Reception*, which facilitated dynamic interactions between early-career and more experienced leaders in anesthesiology science. This reception gave scholars an opportunity to solicit targeted advice from and make connections with seasoned mentors. The eSAS board gratefully thanks all of the mentors – most of whom are active AUA members! – for generously volunteering their time and expertise to help guide early-stage scholars.

The eSAS members not only organized the second annual Scholars' Program but they also presented as part of a full research panel, *Innovative Perioperative Inflammation Research, from Basic, to Translational, to Clinical Science*. Three physician-scientists from three countries, Canada,

USA, and the Netherlands, presented their work spanning the entire spectrum from preclinical, to translational and clinical research, respectively. Dr. Sinziana Avramescu, Assistant Professor of Anesthesiology at the University of Toronto, talked about the cellular mechanisms by which inflammation increases neuronal sensitivity to GABAergic anesthetics. Dr. Brice Gaudilliere, Assistant Professor of Anesthesiology at Stanford University, spoke about an innovative method, mass cytometry, of identifying immune predictors for recovery after surgery. Dr. Thomas Ottens, Specialist Registrar in Anesthetics at the University Medical Center Utrecht, described the role of steroids in modulating the immune response in cardiac surgery and their impact on clinical outcomes. The three panelists also talked about some of the challenges and opportunities they faced at the beginning of their careers as clinician-scientists.

One of the major themes we heard from attendees was gratitude: we and the other early-career scholars are tremendously grateful for the enormous amount of support from Drs. Mashour and Avidan, and the senior members of our specialty that was evident at the meeting. While individually we have all benefited enormously from supportive home departments, this meeting has provided the structure that allowed us to see such a tremendous outpouring of enthusiasm and support from the wider academic anesthesiology community. Apart from the programming itself, the 2017 Scholars' Program was a forum in which we, early-career scholars, were invited to interact with some of the most highly-regarded and successful scientists and leaders in the field as peers and colleagues. We thank the IARS and AUA, as well as FAER and the ASA, for their support and we look forward to active involvement in future meetings and to helping solidify the pipeline of anesthesiology-scientists that will move our field forward for decades to come.

*eSAS welcomes all early-stage anesthesiology scholars and scientists (from medical/graduate students through junior faculty) to join our group. To join, please visit us at [esashq.org](http://esashq.org).*



AUA 64th Annual Meeting Scholars' Program attendees.

# AUA Host Program



Warren S. Sandberg, MD, PhD  
Vanderbilt University Medical Center  
Nashville, Tennessee

The host program focused on infectious disease prevention and management, with a perspective on the vaccine and pharmaceutical approaches to viral illness. In the first presentation, Kathleen Neuzil, MD, MPH, FIDSA, Professor of

Medicine at the University of Maryland discussed “Developing and Deploying Influenza Vaccines: The Pandemic-Seasonal Interplay”. Dr. Neuzil is deputy director of the University of Maryland School of Medicine’s Institute for Global Health, as well as director of the Center for Vaccine Development. Dr. Neuzil’s presentation began with a review of the currently licensed influenza vaccines and gave a hint of those in development, as well as a view of how market forces shape the currently available and potential future vaccine pipeline. The influenza vaccine is variably effective, but vaccine coverage in the US is high, which means that most years the vaccine is efficacious at preventing the worst manifestations of epidemic flu in the US. The combination of large absolute numbers of doses used (and the fact that the vaccine is useful for only one season), even when coupled with a relatively low cost of the established technology assure influenza vaccination’s place as a major component of the vaccine and pharmaceutical market.

In the second presentation of the session, Shyamasundaran Kottilil, MBBS, PhD, Professor of Medicine at the University of Maryland discussed “The Beginning of the End of Hepatitis C – 2017”. Dr. Kottilil has conducted several pivotal investigator initiated studies in hepatitis C and as one of the founding members of the US National hepatitis C treatment guidance panel. Dr. Kottilil’s presentation title differed from that published in the AUA program – which had substituted “HIV” for “Hepatitis C”. The presentation related to hepatitis C was somewhat more optimistic than might be expected for HIV, since there are now multiple highly effective treatments that can cure hepatitis C, while HIV has instead become a manageable, but still chronic and transmissible disease. The public health burden of chronic hepatitis C infection was reviewed, followed by an introduction to the recently developed curative therapies. These two (soon to be more) drugs have staggeringly high price tags (for the US market) when considered in isolation. However, when considered against the cost of chronic hepatitis C management, the antiviral drugs seem cost beneficial. The real rub for the US healthcare system is the impact of concentrating this cost into the few months required for therapy, which, in turn, is pressuring local health system budgets (such as city hospitals or prison health systems) and Medicaid budgets. Balanced against this cost is the high cure rate, which opens the promise that HCV could be substantially curbed or even eradicated by the combination of effective drug therapy and proven public health measures to interrupt transmission.

## AUA 64<sup>th</sup> Annual Meeting



More photos from the AUA 64th Annual Meeting [here](#).

# EAB Report: Summary from Annual Meeting 2017



Robert R. Gaiser, MD  
Educational Advisory Board Chair (EAB)  
University of Pennsylvania,  
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The Educational Advisory Board presented two panels at the recent annual meeting in Washington, D.C. The first panel addressed the science of assessment and included Drs. Boulet, Mahmood, and Levine as speakers. The second panel presented the evidence behind the hot topics of anesthesia education and included Drs. Martinelli, McEvoy, and Schell.

The panel for the science of assessment was presented by international experts in assessment. The first speaker was Dr. Jack Boulet, who is Vice President, Research and Data Resources, Educational Commission for Foreign Medical Graduates (ECFMG), Foundation for Advancement of International Medical Education and Research (FAIMER). For the past 20 years, Dr. Boulet has worked on the development of performance-based credentialing assessments in medicine. His presentation was “The Science of Clinical Performance Assessment.” Dr. Boulet highlighted the importance of, and need for, assessment of clinical performance that generates meaningful scores that are psychometrically sound. This assessment should focus on knowledge, skills, procedures, and clinical reasoning. The problem with assessment of clinical performance is competency contamination in which attempts are made to assess aspects that are difficult to define such as professionalism. For assessment of clinical performance, simulation has been used. Simulation may use standardized patients in which the same conditions exist for all candidates or may use a partial task trainer such as what is used for assessment (and education) of intravenous access, intubation, or echocardiography. Simulation-based assessment is currently a part of the licensure and certification process USMLE Step 2

CS, Step 3, American Board of Emergency Medicine, American Board of Anesthesiology, and the Royal College of Physicians and Surgeons. When scoring a performance assessment, the focus must be on an observable behavior. The scoring may be based upon an explicit process (a checklist), an implicit process (a rating scale), or an explicit outcome (patient status). The advantages to an explicit process is that it is easy to develop, it records what was done, and it may be used by non-physician scorers. The advantages to an implicit process is that it relies upon an expert, it takes into consideration many factors, and physicians tend to prefer to be evaluated by fellow peers. The disadvantage is that experts are expensive and the scores are subject to the objectiveness of the evaluator. Regardless of the method of scoring, it is important that the scores be defensible with the scorers receiving training as well as quality assurance. When discussing assessment, the concepts of reliability and validity apply. Reliability reflects the consistency of the scores and whether the score is a reasonable reflection of the true ability of the individual. Validity refers to the inferences that are made based upon the score and whether it measures what it is supposed to measure. The problems with using simulation for assessment is that the simulation may not predict how the individual will react in a real life situation. There are benefits to assessment in that the individual reflects about the experience and the assessment may generate additional curriculum. As performance assessment advances, there has been use of computers for analysis of the time spent talking, for vision analysis, and for measuring specific actions upon a mannequin.

The second speaker of the panel was Dr. Feroze-Ud-Din Mahmood, Associate Professor of Anesthesiology, and Director of Cardiac Anesthesiology at Beth Israel Deaconess Medical Center, who presented on the Clinical Application of Clinical Performance Assessment. Simulation may be applied to the clinical situation. It allows learners to perform procedures that they may not encounter, it allows faculty to educate learners with less time, and removes the disorientation that typically accompanies the first time a procedure is performed. The



EAB Program Panel I: *The Science of Assessment of Clinical Performance*. L to R, John (Jack) R. Boulet, PhD; Feroze-Ud-Din Mahmood, MBBS; Adam Levine, MD.

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# EAB Report

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advantage to simulation is that it is reproducible and allows the incorporation of a cognitive element with a learning curriculum. The fundamentals of a course involving simulation include multimodal, content, frequency, and a well-defined endpoint. When examining the use of simulation for echocardiography, the learning opportunity must include which machine to use, which probe to use, knobology, image optimization, and image acquisition. An important point to master for the learner is meta-cognition: the understanding of what you need to do, knowing what you need, and then knowing when you have accomplished the task and know how to do it. The reason many are not successful with simulation is the lack of metrics. Metrics are a set of tools to objectively quantify and track repeated measurements or performance of a defined skill. Current metrics include observation, time to do a task, or whether one successfully completes the task. The next level of metrics are motion metrics which provides more information on manual dexterity and allows the individual to advance more quickly as individual steps are mastered. With motion metrics one is able to determine the wasteful steps that may be eliminated. More sophisticated metrics should be applied for the measurement of skill acquisition.

The final presentation in this panel provided information on performance assessment for reentry and was presented by Adam Levine, MD, Vice-Chair for Education and Professor of Anesthesiology at the Icahn School of Medicine at Mount Sinai. Despite the increase in the number of medical students, it is predicted that there will be a shortage of physicians of 50,000 by 2025. There are several means to address this shortage with one method being the development of reentry programs. Reentry addresses a deficiency in a person's knowledge and skills. After not performing a procedure or using a certain set of knowledge for about two years, retraining will be required. The American Medical Association has established guidelines for reentry training which must be accessible, collaborative, ethical, flexible, modular, and innovative. Reentry training for anesthesiology must include crisis management and other skills that the majority of other physicians do not need. Simulation for reentry is both formative as well as summative. In summative assessment, a certain objective must be achieved for reentry. Of those who perform reentry training, 70% are successful and are able to return to practice. The advantage of performing a reentry program is that it improves the confidence of the provider and helps modernize the learner's practice. The use of simulation for reentry allows for determining competence, maintaining a license, as well as fostering a relationship with the anesthesia community.

The second panel assessed the evidence behind the "hot" topics in medical education. Medical education has advanced beyond a traditional classroom in which the professor lectured and the students took notes and would take a test to assess knowledge.

Dr. Susan Martinelli, Associate Professor and Associate Program Director at the University of North Carolina, discussed



EAB Program Panel I: *The Science of Assessment of Clinical Performance*. Feroze-Ud-Din Mahmood, MBBS, presents "Clinical Application of Clinical Performance Assessment."

the flipped classroom. The flipped classroom involves a lecture that is observed on-line prior to an in-class session focusing on the application of that knowledge to problem solve. Interestingly, the homework is done prior to the class compared to the traditional classroom in which the homework is done after class. The on-line video should be short (approximately 15-20 min) and should address the key foundational concepts of the topic. The proposed benefits of the flipped classroom include efficiency, flexibility, and engaging the learners. The flipped classroom encourages teamwork learning while improving knowledge acquisition and retention. The majority of the work done in flipped classroom has been in other areas of healthcare such as pharmacy. Although there has been a demonstrated learner preference for the flipped classroom, findings in benefits in knowledge acquisition have been mixed. A systematic review of the flipped classroom in medical education confirmed these findings. Of the 46 articles examined, the learners preferred the flipped classroom but the knowledge gain was no different than in a traditional classroom. A recent study of the flipped classroom in anesthesia education (to be published in the *Journal of Graduate Medical Education*) also found that the learners preferred the flipped classroom and did find a small benefit in knowledge retention for the flipped classroom. When anesthesia faculty were queried regarding the flipped classroom, the perceived barriers included preparation of the learner, lack of comfort with the flipped classroom, and the time to prepare. These barriers may be addressed through faculty development.

Dr. Matthew McEvoy, Professor of Anesthesiology and Vice-Chair for Education at Vanderbilt University, presented on "Spaced Education – What is that and why should I use it?" Spaced education involves exposure to educational material over intervals as compared to a single lengthy learning opportunity. Some concerns with using spaced education include the work needed to create new material and the manner in which it

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# EAB Report

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challenges programs to accommodate traditional, lecture-based educational curricula to one that is more spaced over time. As an example, in a busy clinical practice, it is difficult to free up an instructor over several periods as compared to one longer period. However, leveraging current technologies can make this a moot point as spaced education has most frequently been employed through the use of email or texting (in the largest randomized clinical trial). The benefit to spaced education is that concepts may be built upon evidence-based principles of neuroscience (i.e. information encoding, repetition, retrieval-based practice, and test-enhanced learning). While spaced education has significant evidence from other medical and non-medical disciplines, there is no study that has proven the efficacy of this pedagogical approach within anesthesiology and perioperative medicine. As such, it is an area for educational scholarship.

Dr. Randall Schell, Professor of Anesthesiology and Vice-Chair for Education at the University of Kentucky, presented “Test enhanced learning: Stop restudying and take a test.” Testing requires that the learner call information to mind rather than passively rehearing or rereading it. It is the retrieval process that enhances learning. In several studies, repeated testing of information improved the long term retention of the information as compared to repetitive studying. In fact, scores were 13% higher with repetitive testing as compared

to repetitive study. Repeated formative quizzes and tests are a powerful tool for learning rather than being used solely for assessment. Retrieval practice promotes knowledge retention by memory trace elaboration and creation of new retrieval routes. Functional MRI has demonstrated a neural correlate of retrieval based memory enhancement in the hippocampal area as well as other areas of the brain that forms different neural connections compared with restudy. An indirect effect is that continual assessment allows the learner to know what he/she knows and does not know (feedback) to guide learning in future study. To be most effective, tests should be generative (i.e. short answer) rather than recognition (i.e. MCQs) when possible and the questions should be of sufficient difficulty to require effortful recall. Repeated testing spaced over weeks or even months will facilitate long term knowledge retention. Feedback should be provided to the learner after these tests as the feedback itself enhances retention and helps the learner close the gap between actual and desired learning. When designing the tests, it is important to align the questions with the educational learning objectives. In summary, retrieval practice via testing promotes long-term retention of knowledge. Repeated testing, distributed over time, and with feedback leads to the greatest benefits.

Attendees at the AUA 64th Annual meeting had a wonderful evening reception at the Smithsonian's National Air and Space Museum. This is the home of the world's largest and most significant collection of aviation and space artifacts.



# SAB Report of AUA Annual Meeting 2017



Y.S. Prakash, MD, PhD  
Chair, AUA Scientific Advisory Board  
Mayo Clinic  
Rochester, Minnesota

It is a pleasure to report on another exciting and successful Scientific Advisory Board program at the 64th Annual AUA meeting in Washington, DC. We had a total of 159 abstracts

submitted, representing a >25% increase from 2016. A vast majority of these abstracts were submitted by residents, fellows, and junior faculty members in the US. Impressively, there was an ~35% increase in the number award-eligible submissions by anesthesia residents, and a 200% increase in the number of award-eligible junior faculty abstract submissions.

The SAB committee of 12 members and a number of volunteer members (see below) blindly scored all submitted abstracts with the top 3 resident abstracts selected for awards and oral presentation and the top 4 junior faculty awards selected for oral presentation. Additional top ranked abstracts from the general membership were then selected for oral presentation for a total of 16 10-minute oral presentation, split into two sessions each on two days of the meeting. The SAB Oral Sessions were distributed between bench research and clinical research. The first session focused on emerging themes in cardiopulmonary field, the second on neuroscience, the third on pain pathways and pain management, and the fourth session on perioperative care.

Congratulations to the following individuals on winning their awards:

## Junior Faculty Awards

1. Peter Yim, MD, Columbia University “Photo-relaxation: light mediated airway smooth muscle relaxation”
2. Soban Umar, MD, PhD, UCLA “Implication of LDL receptors in the development of pulmonary hypertension”
3. (perioperative medicine) Jennier Hah, MD, MS, Stanford “A randomized trial of perioperative gabapentin to promote pain resolution and opioid cessation in a mixed surgical cohort”
4. (pediatric anesthesia) Loren Smith, MD, PhD, Vanderbilt “Perioperative decline in high density lipoprotein particles is associated with increased risk of AKI after cardiac surgery”

## Resident Travel Awards:

1. Bradley Fritz, MD, Washington University “Sensitivity to volatile anesthetics predicts postoperative delirium”
2. Matthias Kreuzer, PhD, Emory University “Weak EEG alpha-power during general anesthesia as amarker of delirium in the PACU” (Margaret Wood Resident Research Award)
3. Richard Boyer, MD, PhD, Harvard/MGH “Clinical study of non-invasive venous waveform analysis (NIVA) for prediction of fluid responsiveness in spontaneously breathing subjects”

Thank you to the SAB members for all the help in organizing the sessions, and the joint AUA-IARS symposium (see separate report): Matthias Riess, MD, PhD (Vanderbilt), Wei Chao, MD, PhD (MGH), Peter Goldstein, MD (Cornell), Jianguo Cheng, MD, PhD (Cleveland Clinic), Thomas F. Floyd, MD (Stony Brook U), Jae Woo Lee, MD (UCSF), Lucy Chen, MD (MGH), Edward Sherwood, MD (Vanderbilt), George Gallos, MD (Columbia), Holger Eltzschig, MD PhD (UTHSC), Tomiko Hashimoto, MD, PHD (UCSF). A special thanks to Lucy Chen, Ed Sherwood, Peter Goldstein, and Tom Hashimoto for moderating the SAB oral sessions. And a final thank you to the many volunteers for helping with abstract evaluations.



Jennifer Hah, MD, MS, presents *A Randomized Trial of Perioperative Gabapentin to Promote Pain Resolution and Opioid Cessation in a Mixed Surgical Cohort* at the AUA 64th Annual Meeting.



Bradley A. Fritz, MD, presents *Sensitivity to Volatile Anesthetics Predicts Postoperative Delirium*.

# Joint AUA-IARS Symposium 2017: Recognizing the “Painful” Truths of the Opioid Abuse Epidemic



Y.S. Prakash, MD, PhD  
Chair, AUA Scientific Advisory Board  
Mayo Clinic  
Rochester, Minnesota

The 64th AUA Annual Meeting was recently held at the Grand Hyatt Hotel in Washington DC. For the second year, we celebrated the successful alignment of the AUA and the IARS in furthering the science of anesthesiology and perioperative medicine by holding a joint AUA-IARS symposium. This year, the topic was “Recognizing the “Painful” Truths of the Opioid Abuse Epidemic.”

The AUA membership is certainly well aware of the increasing use and abuse of prescription opioid medications that has now reached epidemic levels worldwide. The opioid epidemic, recognized by the US Centers for Disease Control as such, is frequently highlighted by the news media, either following tragic opioid overdoses, identification and breakup of illegal drug distribution networks, or heartbreaking stories of how opioid abuse has resulted in destruction of professional and personal lives. Needless to say, the associated healthcare and economic burden is substantial. A number of likely underlying causes for this epidemic have been recognized, including increased volumes of opioid prescriptions, facilitating patterns of opioid prescribing particularly by primary care providers and surgical services (i.e. care providers who are not pain physicians), surging prescription drug diversion, opioid abuse, patient addiction and overdose. In addition, surgery has been identified as a risk for chronic opioid use, particularly if perioperative pain control is inadequate, thus creating opportunity for abuse, diversion and overdose. Thus, our specialty (and we include pain physicians here) face a challenge of balancing two duties. The first (and foremost) is our duty to provide appropriate and adequate opioid-based pain relief in the perioperative (or even chronic) setting while ensuring patient safety, which helps improve patient outcomes and satisfaction. The second is our shared responsibility with the larger medical community in recognizing, understanding and addressing both perioperative and chronic factors that contribute to the problem of opioid abuse, even if substantial aspects of the global epidemic are not entirely attributable to our specialty per se. In this regard, there is an unmet need for many in our specialty to understand and appreciate both specialty-related and broader medical community-related aspects of opioid use and its consequences from research, education and clinical practice perspectives.

The goal of this joint AUA-IARS symposium was to identify and help answer the most important questions relating to opioid abuse where our specialty can “make a difference” via research, education, practice as well as stewardship and community

engagement for patient advocacy. Here, the AUA and IARS are optimal initial platforms to “spread the message,” given that our attendees represent established and emerging leaders in research, education, practice, administration and global citizenship. Via the symposium, we hoped to help recognize what (and how big) a role we can play in the perioperative environment in terms of appropriate and satisfactory pain control (especially using multimodal approaches). From a research perspective, given many of our neuroscience-based colleagues perform studies on mechanisms of opioid action and abuse, understanding such mechanisms would help us in improving opioid administration as well as developing novel abuse-deterrent formulations with comparable (even improved) efficacy. Furthermore, as relative experts in opioid administration and recognition of their limitations/side effects, our specialty is ideally suited to lead the charge in improving prescription practices in the perioperative arena, as well as with chronic opioid administration in the non-surgical settings. This is particularly relevant given our specialty’s focus on patient safety, our engagement with federal entities such as NIDA and the CDC, and other governmental and medical agencies focused on the opioid epidemic. And finally, as a specialty largely focused on the surgical environment, it is important for us to recognize the “consequences” of the opioid abuse seen by the frontlines of community medical providers, particularly the emergency rooms, and thus consider greater participation in ensuring overall improved opioid prescription development and practice.

The Symposium was moderated by Jeanine Wiener-Kronish, MD, PhD (MGH), and me. The speakers (also serving as panelists during the discussion phase) were Wilson Compton, MD, MPE (NIDA), Ellen Fields, MD, MPH (FDA), Mary Jeanne Kreek, MD (Rockefeller), and Lynn Webster, MD (PRA Health Sciences).



At the AUA 64th Annual Meeting Symposium, *Recognizing the “Painful” Truths of the Opioid Abuse Epidemic*, Mary Jeanne Kreek, MD, speaks on “Mechanisms of Opioid Abuse: Dissecting Necessary from Unnecessary Need.”

Continued on Page 12

# Joint AUA-IARS Symposium 2017

*Continued from Page 11*

Dr. Compton initiated the symposium with a presentation on the causes and prevention of drug abuse. A psychiatrist by training, as Deputy Director of NIDA, he provides scientific leadership in development, implementation, and management of NIDA's research portfolio. Dr. Compton provided perspectives on the opioid epidemic, recent trends and factors that contribute to the problem. He highlighted the fact that drug diversion due to excessive and frequently improper prescribing involves fentanyl and tramadol, along with benzodiazepines. A particular contributory problem with fentanyl is the ability for it to be manufactured legally and in fact mailed to users and abusers alike through entirely appropriate channels including the US postal service, making it difficult to monitor trafficking and indeed even the overall scope of the problem. The "appeal" of fentanyl is the known "high" abusers get, without the sedative effect. Overall, NIDA estimates 33K-55K deaths relating to drug use. Such an epidemic shows temporal and geographical variations, with heroin being a major contributor to the epidemic since 2010, and substantial illegal activities particularly on the East Coast. Indeed, opioid misuse is a risk factor for heroin use. The drug epidemic also contributes to increases in infectious disease such as HCV and HIV.

What factors could play a role in opioid addiction? Dr. Compton emphasized motivation, impaired learning and memory, and inhibition control failure as key factors. Novel imaging and neuroscience studies suggest decreased connectivity between the frontal lobe and deeper brain structures overall affecting judgment. Emerging ideas on the use of biomarkers of pain to guide therapy are gaining ground. With the well-recognized pharmacology of currently used opioids, there is increasing interest in the development of biased agonists that provide analgesia but are not addicting.

What can be done to minimize opioid abuse? Certainly, limiting the "epidemic" of over-prescribing narcotics should be helpful, especially when patients with a history of overdosing continue to get increased amounts. The use of naloxone or other drugs represents an intervention point where the combination of pharmacology and behavioral modification could be introduced. The HHS leadership has shown interest in enhancing surveillance as well as bench through clinical research to better understand the problem. NIDAMED is a NIDA-supported website with resources to help medical and health professionals learn about substance abuse and approaches to treating patients. The NIH also recently concluded an Opioid Research Initiative to better understand the problem and identify key areas for further research.

Dr. Fields serves as Deputy Director of the Division of Anesthesia, Analgesia and Addiction Products in the Office of New Drugs of the Center for Drug Evaluation and Research at the FDA. She provided the FDA's perspective and mandate related to the opioid epidemic, and potential avenues to addressing this major public health problem. She summarized the National Drug Abuse Prevention Plan and emphasized the need for education in every medical specialty. She highlighted the FDA Action Plan

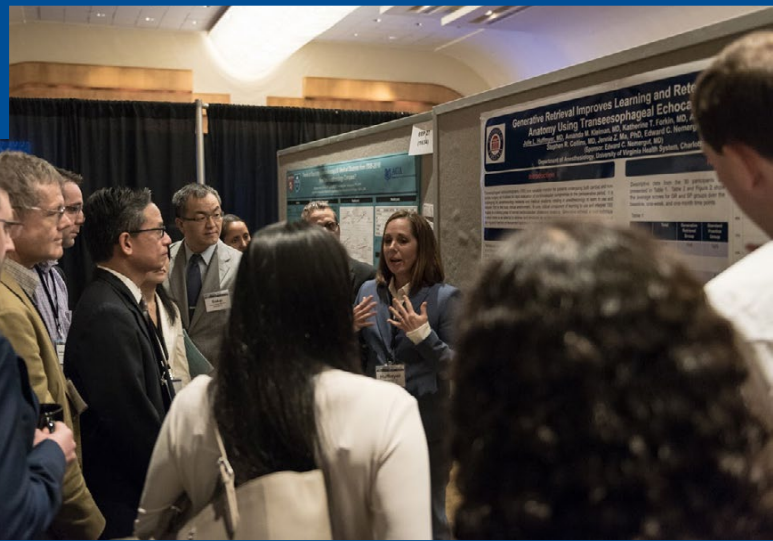
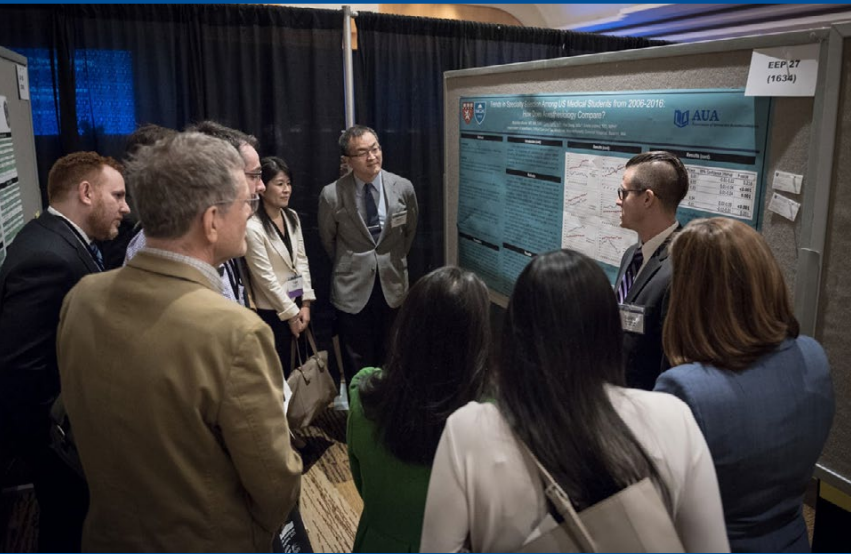
that goes through the flowchart of assessing risks vs. benefits of specific opioid formulations, control of prescription policies, assessment of necessary regulations followed by establishment of policy that promotes science and collaboration for better patient care. Here, the involvement of the National Academic Medicine is a major avenue for advertisement of appropriate policies. Dr. Fields highlighted the ongoing legislative battles regarding healthcare, and the potential impact on opioid regulation. She stressed some recent formulations that may be helpful in this regard: autoinjectors and nasal spray naloxone, subcutaneous buprenorphine, formulations requiring activation following IV administration. Other avenues such as mandatory patient and provider education as well as prescribed drug monitoring were emphasized.

The third talk was by Dr. Kreek and address the mechanisms underlying opioid abuse. Dr. Kreek is well known for her investigations on the biological basis of addictive diseases as well as existing and novel treatments for these conditions. She is particularly known for her pioneering work in the development of methadone maintenance therapy for heroin addiction in the 1960s, a therapy documented to be most effective for an addiction and now commonly used. Dr. Kreek emphasized an oft-forgotten point that addiction is a disease (of the brain) with physiological and behavioral manifestations. She highlighted the ~2M child addicts with 30% being addicted to opioids. She emphasized the "Reduce (prescription), Treat and Reverse (naloxone)" approach. Although drugs such as methadone, naloxone and naltrexone (for drug abusers who are also alcoholics) are well-known, she highlighted emerging approaches such as biased mu-opioid agonists and kappa-agonists. Finally she highlighted the interactions/overlaps between gene (intrinsic tendencies), environment (facilitating) and availability that drive the opioid epidemic.

The final talk was by Dr. Webster, a pain researcher and physician whose research work centers on the development of safer and more effective therapies for chronic pain and addiction prevention. He highlighted the effects of opioids on sleep, the ongoing (and continued need for) testing of new opioid formulations designed to deter misuse, and effective screening methods to prevent opioid misuse. He highlighted the Opioid Risk Tool that he has developed for his public campaign to reduce overdose deaths from prescription medications. He emphasized the continued need for engagement with the FDA, particularly given ongoing efforts to develop abuse deterrent formulations.

These exciting talks were followed by robust and healthy discussion among the panelists and the audience regarding 1) Experiences of anesthesia/pain providers in terms of what opioid abusers, and prescription practices; 2) Provider needs from the FDA, particularly expedited approval of novel formulations that help with monitoring and abuse deterrence; 3) difficulties in performing studies to assess the extent of the epidemic, and controllable factors where anesthesia and pain providers could make a difference; 4) need for research into opioid and abuse mechanisms.

# AUA 64<sup>th</sup> Annual Meeting



More photos from the AUA 64th Annual Meeting [here](#).



May 4-5, 2017  
Washington, DC

# SAVE THE DATE! APRIL 26 - 27, 2018

## AUA 65<sup>th</sup> Annual Meeting

Hyatt Regency Chicago, Chicago, Illinois

Hosted by Northwestern University Feinberg School of Medicine  
and University of Chicago School of Medicine



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FOR MORE INFORMATION,  
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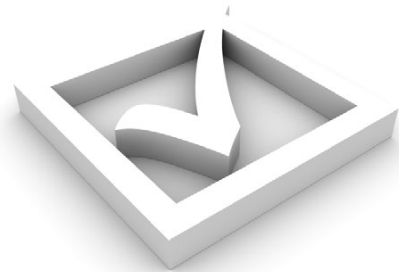
# AUA Call for Member Nominations: Submit Candidates to AUA by September 15!

Nominations for AUA membership are now being accepted, and the process is easier than ever! Simply email your nomination letter and nominee's CV to Vivian Abalama, CAE, at [vabalama@iars.org](mailto:vabalama@iars.org) by **Friday, September 15**. Visit, [AUA Nomination Guidelines](#) online to review the nomination guidelines. Nomination letter must conform to the nomination guidelines on the AUA website to be reviewed.

## QUALIFICATIONS FOR NOMINATION

### Active Membership:

- An individual who occupies and has occupied a faculty position in anesthesiology in a medical school or its affiliated teaching hospital for at least twenty-four months, following completion of residency training in anesthesiology; or
- An individual whose work as an anesthesiologist, teacher, or investigator has demonstrated success in academic anesthesia or an individual who has shown a continued productive interest in and contribution to academic anesthesia.



### Affiliate Membership:

- An individual who has made distinguished contributions to academic anesthesiology, but does not have a primary faculty appointment.

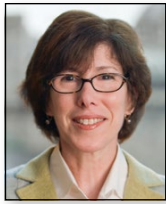
### Associate Membership:

- An individual who holds a faculty position in anesthesiology in a medical school or its affiliate teaching hospital and who has been approved for funding for a K or R-Type Grant from NIH, FAER, AHA, APSF, IARS, or non-U.S. equivalents.
- Must be nominated by a department chair.

*International nominees are welcome for all three membership types. To learn more about the nomination requirements, please see the [AUA Member Nomination Instructions](#).*

Please contact the AUA Membership Department, **Vivian Abalama, CAE**, at [vabalama@iars.org](mailto:vabalama@iars.org) or 415-296-6925 with any questions. **Nominate candidates today and play a part in shaping the future of the AUA!**

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