

## Highlights from the American Heart Association's Basic Cardiovascular Science 2018 Scientific Sessions

David Y. Barefield, PhD;\* Joanne F. Garbincius, PhD\*

The annual meeting of the American Heart Association's (AHA's) Basic Cardiovascular Science (BCVS) council met from July 30 to August 2 in San Antonio, Texas. This meeting highlighted cutting-edge basic and translational cardiovascular research from established investigators and trainees across a variety of disciplines. The BCVS 2018 meeting drew nearly 600 attendees and featured 105 oral presentations across 28 general and special-emphasis sessions and 328 abstracts. The meeting hosted researchers from across the United States and around the globe, with 91 international researchers representing 14 countries. This confluence of the top minds in cardiovascular research provided an outstanding environment to discuss emerging ideas and generate collaborations across this community. Here, we highlight a small selection from the range of session topics from BCVS 2018.

### Welcome Address

Ivor Benjamin, MD, the incoming president of the AHA, officially commenced the meeting. Dr Benjamin, who has been a long-time member of the BCVS council, outlined the importance of the BCVS to impact and improve cardiovascular health through basic, clinical, and population science, and investment in trainees to expand the biomedical workforce. Dr Benjamin reviewed the AHA's evolving funding objectives, laying out initiatives the association is taking to fund the most promising research and make real

changes in the lives of people with heart disease. Dr Benjamin highlighted the importance of the BCVS council to the AHA's overall mission, noting the inspirational work presented at BCVS 2018 from "the individuals doing the best basic cardiovascular science."

### Keynote Lecture

Stefanie Dimmeler, PhD from Goethe University Frankfurt, Germany, delivered the keynote address on cellular heterogeneity and plasticity in cardiovascular disease. Dr Dimmeler's expansive list of publications, professional accolades, and editorial positions with several key cardiovascular journals illustrate the impact of her research career. She shared 2 major stories that her laboratory has developed. The first concerned how endothelial cells contribute to the formation of new blood vessels following myocardial ischemia. Her experiments used lineage-tracing reporters to provide data that regeneration of blood vessels occurs via clonal expansion of a small number of endothelial cells that are able to migrate and expand into the postischemic myocardium. The second story Dr Dimmeler shared focused on the heterogeneity of inflammatory cells in the hearts of patients with heart failure. By collecting circulating blood monocytes, she identified that patients with heart failure have a higher amount of transcriptional heterogeneity, with a high occurrence of clonal hematopoiesis. These circulating monocytes alter inflammatory signaling in the progression of heart failure. These findings may have prognostic value in the assessment and treatment of patients with heart failure. Her ongoing focus is to develop microRNAs for clinical use and apply recent advances in single-cell sequencing to patients with cardiovascular disease.

### Changing the Landscape of Cardiac Fibrosis

One of the kickoff sessions highlighted the importance of cardiac fibrosis in normal and pathological heart function. Modulation of cardiac fibrosis has been identified as a key target in the treatment of heart failure with preserved ejection fraction (HFpEF), and the talks in this session provided a wealth of data on many potential strategies to reduce pathological fibrosis.

*From the Center for Genetic Medicine, Feinberg School of Medicine, Northwestern University, Chicago, IL (D.Y.B.); Center for Translational Medicine, Department of Pharmacology, Lewis Katz School of Medicine, Temple University, Philadelphia, PA (J.F.G.).*

\*Dr Barefield and Dr Garbincius contributed equally to this work.

**Correspondence:** David Y. Barefield, PhD, Northwestern University Center for Genetic Medicine, 303 East Superior Street, Lurie 7-240, Chicago, IL 60611. Email: david.barefield@northwestern.edu

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Jeff Molkentin, PhD from Cincinnati Children's Hospital shared data that establish the origin and migration of the fibroblasts that contribute to the fibrotic response following myocardial infarction. Dr Molkentin's study utilized the *Postn*- and *Tcf21*-MerCreMer and *Actn2*-CreERT2 lineage-tracing reporters driving fluorescent reporters to identify the origin of fibroblasts that proliferate into the site of cardiac ischemic injury.<sup>1</sup> His data showed that myofibroblasts in the infarct border zone migrate into the ischemic tissue within a week of infarct, stabilizing the scar at early time points. Once incorporated into the scar, the myofibroblasts stopped proliferating and began depositing extracellular matrix and disappear weeks later. A subset of endothelial cell-derived fibroblasts proliferated within the scar and persisted. These cells originated from an endothelial lineage that migrate into the site of injury and loses  $\alpha$ -smooth muscle actin expression after they integrate into the tissue. These cells, termed matrifibrocytes, may play a role in maintaining the mature scar, as evidenced by their unique expression signature including genes involved in bone, cartilage, and tendon production.<sup>2</sup> These findings provide specific cellular targets for regulating the development of fibrosis for attenuating pathological fibrosis following ischemic injury.

Amy Bradshaw, PhD from the Medical University of South Carolina highlighted her recent work on the contribution of collagen fibrosis, a hallmark of diastolic dysfunction in HFpEF. Deposition of collagen in fibrosis requires secreted protein acidic and rich in cysteine proteins to process soluble collagen into insoluble, fibrotic collagen. Dr Bradshaw shared data showing that increased macrophage secretion of these collagen-converting secreted protein acidic and rich in cysteine proteins was evident in a model of pressure-overload hypertrophy. Additionally, mice deficient for secreted protein acidic and rich in cysteine proteins with wild-type bone marrow transplantation showed mitigation of fibrotic remodeling following pressure overload. These data add to our understanding of the growing importance of noncardiac cell types in the fibrotic processes that occur during pathological remodeling and provide novel targets for reducing diastolic dysfunction in HFpEF.

Taben Hale, PhD from the University of Arizona provided data supporting the antifibrotic effects of angiotensin-converting enzyme inhibitor treatment. Angiotensin-converting enzyme inhibitors have had a role in the treatment of cardiovascular disease by lowering blood pressure. Dr Hale showed that transient inhibition of the renin-angiotensin system reduces fibrosis and this reduction persists following the cessation of acute treatment. Pretreatment with renin-angiotensin system inhibitors appears to change the fibroblast response to cardiac injury, resulting in milder fibrosis. These data provide a potential direct mechanism of action of angiotensin-converting enzyme inhibitors in regulating fibroblast activity.

Timothy McKinsey, PhD from the University of Colorado presented his work on inhibition of histone deacetylases to treat diastolic dysfunction in HFpEF. Dr McKinsey's study used the histone deacetylase (HDAC) givinostat to treat fibrosis and improve myofilament relaxation. HDAC inhibition has been shown to reduce fibrosis by limiting fibroblast proliferation through epigenetic modulation of fibroblasts. However, in Dr McKinsey's work, the direct effect of HDAC inhibition on myofilament relaxation was evaluated using direct measurements of single myofibril relaxation. This work showed that HDAC inhibition by givinostat reversed the slowed myofibril relaxation found in 2 small animal models of diastolic heart failure. This provides a novel role for HDACs directly altering posttranslational modifications on myofilament proteins. HDAC inhibitors are already used clinically as a cancer therapy, and these data demonstrate a promising potential alternative use of HDAC inhibitors to treat HFpEF.

Karla Maria Pires, PhD from the University of Utah presented the oral abstract for this session describing her research on the transcription factor PR domain containing 16 (Prdm16). Dr Pires used germline knockout and conditional deletion mouse models of Prdm16 for her studies. Homozygous loss of Prdm16 causes early lethality, whereas heterozygous mice and inducible Prdm16 knockout cause robust hypertrophy that was associated with increased transforming growth factor- $\beta$  and Smad signaling. These data suggest that Prdm16 protection against hypertrophy and fibrosis occurs by suppressing transforming growth factor- $\beta$ /Smad signaling and through regulation of mitochondrial function.

Together, these presentations underscored the growing appreciation of the multifaceted role of pathological fibrosis and the diverse approaches that are being pursued to develop treatments for HFpEF and other fibrotic cardiovascular diseases.

## Transcriptional Regulation and Epigenetics

This session started with a talk from D. Brian Foster, PhD of Johns Hopkins School of Medicine who reported on the importance of retinoic acid signaling in hypertension and heart failure. Retinoic acid is a vitamin A-derived transcriptional regulator that has been shown to be reduced in patients with heart failure and dilated cardiomyopathy. Dr Foster demonstrated that treatment with retinoic acid mitigates hypertrophy in a phenylephrine-induced murine hypertrophic cell model. Treatment with talarozole, a CYP26 inhibitor that prevents retinoic acid degradation, increased retinoic acid levels and reduced cardiomyocyte hypertrophy in cultured cardiomyocytes and pulmonary edema in a guinea pig model of heart failure. These findings add to the growing appreciation of retinoic acid and vitamin A in cardiac function and provide potential cardiac disease targets for retinoic acid therapy.

Enzo Porello, PhD from the Murdoch Children's Research Institute in Australia presented data examining how transcriptomes change in cell types that lose regenerative potential, including cardiomyocytes. By comparing transcriptomes of developing, adult, and post-injury cardiomyocytes, Dr Porello revealed a failure of cardiomyocytes to reactivate developmental gene networks after myocardial infarction. Interestingly, while developmental networks were silenced in adult cardiomyocytes, the chromatin environment also changed, making transcription factor binding sites inaccessible for genes in developmental networks. This was not observed in other cells that remain proliferative as they mature. These findings identify an epigenetic basis for the loss of cardiomyocyte regenerative potential following the transition to the adult cell phenotype and provide a regulatory target for ongoing efforts to reactivate cardiomyocyte proliferation.

Tom Vondriska, PhD from the University of California, Los Angeles, presented data on chromatin organization in cardiomyocytes and how the chromatin landscape changes following the development of heart failure. Dr Vondriska used a genetic mouse model lacking the ubiquitous chromatin structural protein CTCF to alter normal chromatin structure. Physically interacting regions of DNA, topologically associating domains, were mapped using chromatin conformation capture to identify how different regions of the genome normally interact and regulate each other. The interacting chromatin domains were disrupted in a mouse model of pressure-overload heart failure compared with sham control mice and underlie the activation or inactivation of gene neighborhoods by epigenetic chromatin restructuring. These data provide insight into the physical interaction of the epigenome and how alterations in this architecture can regulate different disease states.<sup>3</sup>

Samadrita Bhattacharyya, MS from the University of Texas Southwestern Medical Center delivered this session's oral abstract on her work deciphering the enhancers that specify cardiac conduction system cell types. Using a mouse model with a sinoatrial node marker, nuclei from sinoatrial node cells were isolated from the surrounding atrial tissue. The open regions of chromatin were then assessed using these isolated nuclei. These data were combined with sinoatrial node RNA-Seq data to identify novel enhancer elements that drive cardiac conduction system gene expression programs. Identification of these enhancers provides a better understanding of the biology of these cell types, as well as establishing regions of noncoding DNA where mutations can occur that lead to cardiac rhythm disorders.

This session illustrated the recent advances of understanding epigenomic control of gene expression in the context of heart disease and displayed many exciting tools that are being used to provide translational insights into human disease.

## Resurgence of Cardiac Metabolism

This year's conference offered a number of presentations on mitochondrial biology and cardiac metabolism in cardiovascular disease. Zoltan Arany, MD, PhD from the University of Pennsylvania described recent work using a genome-wide clustered regularly interspaced short palindromic repeats (CRISPR) screen to identify accelerators and decelerators of mitophagy. This screen revealed that knockout of the adenine nucleotide translocator (ANT) impairs mitophagy. Subsequent work suggested that ANT's ability to promote mitophagy is independent of its ATP/ADP exchanger activity, but instead may be related to the closure of the TIM22 complex in response to mitochondrial stress and subsequent recruitment of PINK/PARKIN to the mitochondria. This novel role of ANT as a gatekeeper for mitophagy points to the potential for ANT mutations to contribute to dilated cardiomyopathy by disrupting mitophagy, even in patients with intact ANT activity.

Next, Dan Kelly, MD of the University of Pennsylvania shared data examining the importance of the shift in mitochondrial fuel use to favor ketone oxidation over fatty acid metabolism in the failing heart. Dr Kelly showed that mice with cardiac-specific deletion of 3-hydroxybutyrate dehydrogenase 1, preventing the use of ketones as fuel for the heart, exhibit exaggerated left ventricular remodeling in response to transverse aortic constriction. Pathological cardiac remodeling was attenuated when these animals were fed a ketogenic diet, supporting the hypothesis that the shift to ketone oxidation in heart failure is an adaptive response. Dr Kelly backed up this conclusion with exciting results from a canine model of heart failure demonstrating that infusion of 3-hydroxybutyrate is sufficient to protect against tachypacing-induced cardiac dysfunction and remodeling. Together, these findings suggest that targeting fuel metabolism may be a therapeutic strategy for heart failure.

Brad Hill, PhD from the University of Louisville continued the theme of myocardial substrate use by discussing the idea of "autopoiesis," how a system maintains or reproduces itself. Dr Hill examined how glucose metabolism affects anabolic processes and regulation of cardiac homeostasis in the contexts of hypertrophy, dilation, and failure. He noted that glycolysis is higher in the exercise-adapted heart, and described evidence for exercise-induced periodicity in cardiac metabolism. Dr Hill then shared data from a recent study showing that fixing the heart's glycolytic capacity at a constant level and impairing its metabolic flexibility is sufficient to drive physiologic or pathologic hypertrophy.<sup>4</sup> He demonstrated that failing hearts have diminished use of carbon substrates in ancillary biosynthetic pathways and proposed that inhibition of such anabolic pathways may drive pathologic cardiac remodeling and heart failure.

The cardiac metabolism session wrapped up with an oral abstract presentation by postdoctoral researcher Jessica Pflieger, PhD from Temple University about her investigations of the direct role of G protein-coupled receptor kinase 2 (GRK2) in metabolic dysfunction of the failing heart. Dr Pflieger showed that transgenic hearts with increased GRK2 expression have compromised fatty acid uptake coupled with a diminished bioenergetic reserve, which was associated with increased phosphorylation, ubiquitination, and degradation of the fatty acid transporter CD36. Experimentally decreasing GRK2 expression restores CD36 levels in the failing heart. Dr Pflieger's findings support a model in which increased GRK2 expression in the failing heart diminishes CD36 expression and so impairs myocardial fatty acid uptake, leading to impaired cardiomyocyte ATP production and survival.

Together, the studies presented in this session provided ample evidence for the investigation of cardiac metabolism as a promising avenue for the development of novel interventions for cardiac hypertrophy and heart failure.

## Functional Genomics and Pathogenicity Assessment

The advent of next-generation sequencing has provided a wealth of data about cardiovascular disease but has also presented many challenges in interpreting genetic variation in the context of an individual's disease. The Functional Genomics and Pathogenicity Assessment session focused on several facets of this problem. Quinn Wells, MD, PharmD from Vanderbilt University Medical Center explained that the rate of identification of new mutations associated with heart disease has increased well beyond the rate at which the pathogenicity of these mutations can be verified. Dr Wells demonstrated the power of mining large data sets of genetic information to assess the potential role of novel variants to contribute to cardiovascular disease.

Beth McNally, MD, PhD from Northwestern University shared 2 stories evaluating the genetic causes of different types of heart disease. Dr McNally presented data demonstrating that myotonic dystrophy type 1 and type 2 are caused by different genetic mechanisms. Both diseases have been thought to be caused by dysregulation of mRNA splicing. However, using human induced pluripotent stem cell-derived myotubes from patients with myotonic dystrophy, Dr McNally demonstrated that myotonic dystrophy type 1 showed evidence of aberrant splicing events, whereas myotonic dystrophy type 2 myotubes did not. She also presented whole genome sequencing data from a large cohort of patients with dilated and hypertrophic cardiomyopathy with cardiovascular phenotype information. This data set showed that patients with dilated cardiomyopathy had a greater amount of variation in genes encoding cardiac proteins, revealing a multigenic signature for

dilated cardiomyopathy compared with a monogenic signature for hypertrophic cardiomyopathy. Additionally, the severity of disease correlated with an increased mutation burden in cardiac genes in dilated cardiomyopathy, whereas this was not the case for hypertrophic cardiomyopathy.

Kiran Musunuru MD, PhD from the University of Pennsylvania highlighted the problem of dismissing variants of uncertain significance in genetic testing because of our limited understanding of the effect of these variants. Dr Musunuru shared his work developing platforms to rapidly screen variants of unknown significance, the elucidation of which will improve the diagnostic power of genetic sequencing for patients with cardiovascular disease. Using dual integrase cassette exchange gene editing, he demonstrated that he was able to efficiently model several troponin missense mutations in isogenic cell lines. Adapting these concepts to develop simple higher-throughput assays to evaluate other common sources of variants of uncertain significance (eg, titin missense variants) will allow greater utility for genetic testing in evaluating cardiovascular disease risk.

Finally, Mingfu Wu, PhD from Albany Medical College presented the session's oral abstract on the regulation of cardiac morphogenesis. Dr Wu presented data dissecting the role of Numb family proteins in cardiac trabeculation. He demonstrated that Numb family proteins regulate N-cadherin levels by regulating N-cadherin's endosomal recycling from the plasma membrane during development, and loss of this activity resulted in aberrant ventricular trabeculation. These findings shed light onto the developmental regulation of this process and have implications for better understanding ventricular noncompaction cardiomyopathy.

## Architecture of Contraction

This session featured 4 talks focusing on diseases of the cardiac sarcomere. Jil Tardiff, MD, PhD from the University of Arizona described her efforts to develop an integrated platform to test sarcomeric mutations and sort them into hypertrophic or dilated cardiomyopathy categories based on their effects on sarcomere structure and dynamics. Dr Tardiff highlighted a recently developed atomistic model of the thin filament<sup>5</sup> and her use of this model in classifying mutations as dilated/hypertrophic by incorporating their effects on tertiary and quaternary thin filament structure and function. She concluded by emphasizing that sarcomeric mutations do not completely "break" the sarcomere, but instead shift function slightly; thus, all that is needed for viable therapies is to push the key affected parameter (eg, thin filament flexibility) back toward normal in order to get a phenotypic improvement that may benefit a patient.

The University of Cincinnati's Sakthivel Sadayappan, PhD spoke next about his investigations aimed at understanding

the incomplete penetrance and variable cardiomyopathy phenotype in individuals with a 25-base pair deletion in cardiac myosin binding protein-C (*MYBPC3*) that is common among populations of South Asian ancestry. Dr Sadayappan and his team identified a novel missense mutation (D389V) in the portion of myosin binding protein C that binds the  $\beta$ -myosin heavy chain S2 region.<sup>6</sup> This D389V variant occurs on the same *MYBPC3* allele as the 25-base pair deletion, and the combination of the 2 mutations causes cardiomyocyte hypertrophy, an increased incidence of arrhythmia, and a significant increase in cardiac contractility. Dr Sadayappan concluded that co-segregation of the 25-base pair *MYBPC3* deletion with additional variants such as D389V likely accounts for the phenotypic variability in people harboring this deletion. These findings underscore the potential impact of modifier genes on the clinical outcomes of patients with mutations in genes of the cardiac sarcomere.

Beata Wolska, PhD of the University of Illinois at Chicago discussed the molecular basis of inherited cardiomyopathies and the relationship between myofilament calcium sensitivity and the type of cardiomyopathy. She noted that mutations leading to hypertrophic cardiomyopathy are generally associated with increased myofilament calcium sensitivity, while mutations giving rise to dilated cardiomyopathy are characterized by decreased myofilament calcium sensitivity. Therefore, Dr Wolska tested whether overcoming increased myofilament calcium sensitivity and associated diastolic dysfunction could prevent the development of hypertrophic cardiomyopathy. Studies in mice with mutant tropomyosin and exaggerated myofilament calcium sensitivity showed that the introduction of a pseudophosphorylated troponin I to lower myofilament calcium sensitivity back toward normal can prevent pathological hypertrophy. Dr Wolska ended by sharing a recent proof-of-concept experiment showing that a green tea extract corrects calcium hypersensitivity in myofilaments in vitro with a hypertrophic cardiomyopathy-linked cardiac troponin I mutation (K206I).

Finally, David Barefield, PhD from Northwestern University delivered the session's oral abstract. Dr Barefield presented his work on a novel myofilament protein, myosin-binding protein H-like (MyBP-HL). The data showed that MyBP-HL is highly expressed in the atria in humans and mice, as well as in a subset of the ventricular conduction system.<sup>7</sup> Loss of MyBP-HL in a mouse model causes dilated cardiomyopathy and atrial and ventricular arrhythmias. Dr Barefield showed evidence of atrioventricular block in these mice and localization of MyBP-HL to the atrioventricular node. Molecularly, MyBP-HL was shown to be localized in the myofilament A band, and that MyBP-HL and cardiac myosin-binding protein C have a reciprocal relationship, where reduction of 1 protein causes an increase in the other, which may alter myofilament function.

Together, these 4 talks illustrate that the development of therapies for cardiomyopathy aimed at normalizing the behavior of mutant sarcomeres is a practical and realistic goal.

## Outstanding Early Career Investigator Award Finalists and Awards Ceremony

Three exceptional young scientists competed for this year's Outstanding Early Career Investigator Award. Lisandra de Castro Brás, PhD from East Carolina University opened the competition with an account of her discovery that a novel collagen cleavage product, p1158/59, accumulates in the heart following myocardial infarction. Administration of p1158/59 to mice with experimental myocardial infarction reduces fibrosis, attenuates left ventricular dysfunction, and promotes scar formation and maturation, likely by stimulating fibroblast migration and alteration of collagen deposition. Dr de Castro Brás's work provided intriguing proof-of-concept evidence that this endogenous peptide can modulate adverse left ventricular remodeling to help preserve cardiac function after a heart attack.

Next to the podium was Cristi Galindo, PhD from Vanderbilt University. Dr Galindo shared her investigations into the phenotypic variability observed in the hearts of patients with Duchenne muscular dystrophy and presented evidence that higher circulating levels of brain-derived neurotrophic factor correlate with better heart function in these individuals. Pharmacologic stimulation of the brain-derived neurotrophic factor receptor, TrkB, improves cardiac output in a mouse model of Duchenne muscular dystrophy, while pharmacologic inhibition of this receptor exacerbates cardiac dysfunction. Dr Galindo concluded that brain-derived neurotrophic factor is cardioprotective for dystrophic hearts and may be an attractive therapeutic target for cardiomyopathy in Duchenne muscular dystrophy.

Manuel Rosa-Garrido, PhD from the University of California, Los Angeles, presented elegant work using chromatin capture experiments to explore how gene regulation can be coordinated by the spatial arrangement of chromatin into special microenvironments within the nucleus. He explained that heart failure alters the normal 3-dimensional arrangement of chromatin and that sets of genes whose expression increases or decreases in heart failure tend to be organized together into distinct nuclear "neighborhoods." Furthermore, genes found in these active or inactive neighborhoods were characterized by distinct epigenetic marks. Dr Rosa-Garrido proposed that this spatial organization of the genome could be a mechanism allowing for coordinated changes in gene expression, while rearrangement of such chromatin microenvironments may be a common feature of heart failure.<sup>3</sup>

At the BCVS council dinner, the winner of the Outstanding Early Career Investigator Award was announced, with Manuel

Rosa-Garrido from the University of California, Los Angeles, claiming the top honor. All 3 finalists were selected based on their top-scoring abstract submissions. Other award winners were recognized at the event, including 8 recipients of the Cardiovascular Outreach Award, which promotes promising minority or underrepresented early career investigators to attend the BCVS meeting. Additionally, the BCVS sponsors travel awards for early-stage investigators to promote the inclusion of trainees. This year, the BCVS granted an astounding 41 New Investigator Travel Awards.

## Early Career Events

The BCVS has made a clear commitment to providing resources for new investigators in training or at the beginning stages of their independent careers. This year's early career programming kicked off with Dr Sakthivel Sadayappan's perspective on how to overcome common career hurdles. Dr Sadayappan urged audience members to consider making the best choice available to them, rather than a choice that is merely "comfortable" when weighing different career options, and to actively seek out scientific discussions with peers, mentors, and colleagues. He noted the importance of trainees finding a mentor who will promote them, and emphasized the need for scientists to learn how to promote themselves as well. The session concluded with Dr Sadayappan's reminder that success requires passion and resourcefulness, which he defined as "the ability to find quick and clever ways to achieve ones' scientific and professional goals."

A special early career session was held, entitled Navigating Your Career: Finding Success and Happiness With a PhD. This session consisted of a series of presentations from an established faculty, a postdoctoral fellow, and a current doctoral graduate student. Mark Sussman, PhD from San Diego State University delivered a spirited analysis of how scientists can cultivate an "omnivert" personality type to address the varied aspects of a life in research, from quiet bench science to enthusiastically presenting data to large crowds and being comfortable networking with your peers. Catherine Makarewich, PhD, who has performed her post-doctoral training in Eric Olson's laboratory at UT Southwestern Medical Center, presented some of the wisdom she has gathered during her career. Adrian Arrieta, a graduate student at San Diego State University in Christopher Glembotski's laboratory, contributed his perspective as an early stage trainee. A panel discussion with these 3 researchers followed, covering topics from the audience including mentorship, networking, and the importance of defining a career path and goals as a developing researcher.

The Early Career Committee organized a sold-out networking lunch and mentorship roundtable forum with many of the

scientific leaders within the BCVS. Dr Merry Lindsey, PhD from the University of Mississippi Medical Center delivered a presentation on mentorship, highlighting the challenges faced by trainees by using a host of her own current and previous trainees as examples. This provided rich insight into the challenges of providing mentorship to a wide range of trainees. The networking roundtable gave young investigators the chance to sit down with many outstanding BCVS investigators. These conversations provided excellent networking opportunities and a chance for these investigators to pass on bits of career development wisdom for many trainees.

## Conclusions

The 2018 BCVS meeting was an inspiring display of innovative research by the leaders in basic cardiovascular science. The multitude of topics covered and the effort dedicated to promoting collaboration and career development was a testament to the importance of the BCVS council in fulfilling the AHA's mission. The new BCVS council chair, Joe Wu from Stanford University, the Program Committee, and the Early Career Committee of the BCVS deserve special thanks, as their efforts were evident in the high quality of this meeting.

## Disclosures

None.

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