



**ASCEND**  
 Center for Biomedical Research

— THE FIRST YEAR —

*The right approach,  
 in the right place,  
 at the right time.*






COVER (clockwise from top left): Ijeoma Eziefula, Kelly Boham, Jade Talmadge, Jada Boyd, Karanon Tubo, Oluwafunmilayo Ayeni, Markea Carter, Oluwatobi Samagbeyi, Jazzmyn Rodriguez, Abdullah Abdul, Milan Criss, Aliyah Tolliver, Chey Harris, Joy Barnes.  
 ABOVE (clockwise from top left): Nesha Jackson, Ashleigh Williams, Xavier Knight, Deshawn Collington, Givania Griffin, Shirley Green.

A FEW WORDS FROM THE MSU BOARD OF REGENTS



The ASCEND Program at Morgan State University is an outstanding research training model for undergraduate students. It invests in the leadership and creativity of our youth as it supports them in conceiving, planning and developing their own research and solving the real problems of their own communities. It is gratifying and heartwarming to see the National Institutes of Health making such a substantial investment in our minority-serving institutions through the BUILD initiative.  
 —Kweisi Mfume FORMER PRESIDENT/CEO, NAACP



Despite the important advances we have made over the last hundred years, our nation still suffers from huge racial disparities in health. African Americans live sicker and die sooner than their White counterparts. We need well trained minority health and biomedical researchers who understand these disparities and are dedicated to eradicating them. The brilliantly conceived and well-designed ASCEND Program at Morgan State University is exactly the right approach, in the right place, and at the right time.  
 —Elijah Cummings U.S. REPRESENTATIVE FROM MARYLAND'S SEVENTH CONGRESSIONAL DISTRICT



It is predicted that by 2044, the United States will be a majority minority country. Our diversity can be our greatest asset, but we must ensure that all sectors of our society benefit from the best education available in the world. The ASCEND Program promises to do exactly that. It will nurture students' natural curiosity as it educates them to become leading scientists and researchers.  
 —Shirley Malcom HEAD OF EDUCATION AND HUMAN RESOURCES PROGRAMS, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)

WORDS FROM MSU PRESIDENT, DR. DAVID WILSON



The ASCEND (A Student-Centered Entrepreneurial Development) Training Program, funded at \$23.3 million over five years by the National Institutes of Health, will advance Morgan State University’s long legacy of nearly 150 years of educating minority students. Morgan State is one of the top five universities in the country granting undergraduate degrees to African Americans. According to the National Science Foundation, it is number one in training undergraduates who later receive PhD’s in engineering, and ranks tenth in graduating students who later earn PhD’s in the life sciences. Our faculty and students, primarily of African American descent, have received nearly 200 Fulbright Scholarships.

We are proud of our past, but we look forward to an even better future. The ASCEND Scholars Program has been conceived and designed to maximize student learning, creativity, and productivity in science research by putting students and their ideas at the center. Traditional undergraduate research training is based on the apprenticeship model through which students are recruited to execute research projects that have been developed by their professors. In contrast, ASCEND takes an entrepreneurial approach in which the student identifies the research questions and designs and executes the research plan to answer those questions. Faculty support the students in their inquiries and exploration, but are not the “boss.” This innovative approach allows creativity to blossom and autonomy to flourish.

The ASCEND model has the potential to revolutionize undergraduate research education in both minority- and majority-serving institutions. It is the personification of Morgan State’s motto: *Growing the future, leading the world.*

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A MESSAGE FROM THE PRINCIPAL INVESTIGATORS

It has been one year since the National Institutes of Health funded ASCEND. The program has been designed to implement a novel student-centered model for undergraduate research training. In this approach, the students choose their own research topics, develop their own proposals, and conduct their own research. Students are the centerpiece of the program: the thinkers, the doers, and the entrepreneurs—it is expected that this approach will maximize students’ investment in research because it is theirs!

This summer we implemented the entrepreneurial model for the first time. The results have been very encouraging. Our 29 Summer Research Institute students developed eight high quality health research proposals. Their presentations of their summer work clearly impressed the ASCEND Research Team and the visiting scientists from our partner research institutions. The top 20 of these students were named ASCEND Scholars. Over the next two years they will receive the best training and support available.

To sustain and advance student learning and research skills, ASCEND is enhancing Morgan State University’s (MSU) capacity by providing support for faculty, improving the University’s research facilities, and strengthening relationships with our research and pipeline partners. We have made substantial strides in all of these areas. *(See infographic, page 28.)*

The ASCEND Program has great potential to affect the lives of people beyond the campus. By combining entrepreneurship with community-based participatory research, we are especially confident that ASCEND Scholars will find solutions to some of the most important health problems affecting minority populations and communities around MSU.

This report summarizes ASCEND’s accomplishments in its first year. It also showcases ASCEND’s potential to revolutionize research training for undergraduate students as it provides valuable service to the University’s surrounding community and beyond.



Farin Kamangar, MD, PhD



Payam Sheikhattari, MD, MPH

## Shifting the Paradigm in Undergraduate Research Training from Apprenticeship to Entrepreneurship

*One of my friends ... an extremely hard-working student with top grades, was looking into both a career in medicine and research. However, his first experience at the bench felt like a burden. He described his time in lab as a series of boring chores with no context and little guidance beyond how to complete the task at hand. Although he later went on to medical school, he abandoned his desire to pursue graduate studies in basic science.*

Sean Lim, COLUMBIA UNIVERSITY (FROM PLOS STUDENT BLOGS)



Who do we want our students to be? Apprentices? Or Entrepreneurs?

Undergraduate researchers have traditionally served as apprentices. They have been able to learn specific research techniques this way, such as running a gel. After repeating the procedure many times, they master it and move on to the next technique. Many student apprentices have mastered specific research techniques and some of them have gone on to become great researchers. But as expressed in the quote above, the apprenticeship approach to training may disappoint many of the best and brightest.

A main goal of ASCEND is to shift the paradigm of undergraduate research training from apprenticeship to entrepreneurship. Entrepreneurs maintain a sense of ownership that encourages creativity. In business, entrepreneurs conceive and implement their own ideas. They plan, launch, and run their own companies. We believe that undergraduate student researchers can flourish under the same model. As entrepreneurs, students choose their own research topics, write their own proposals, and conduct their own research. An entrepreneurial approach encourages greater investment and more success.

ASCEND has developed several components to make this happen. Students attend a Summer Research Institute where they are supported in choosing a research topic and writing a proposal. A number of the participants are then selected as ASCEND Scholars, who will be supported in conducting, analyzing and reporting their research over the next two years. Students are supported by a *community of mentors* in each of these phases.

Entrepreneurship develops and prospers within a community. It is not a coincidence that the San Francisco Bay Area is where innovative companies like Yahoo, Google, and Facebook have developed and thrived. The ASCEND Student Research Center will be a kind of Bay Area that provides community and peer support. It will be an incubator where inquisitive minds meet, teach, and learn from each other.

The next few pages describe the Summer Research Institute, the Scholars Program, the Student Research Center, and ASCEND's mentoring system.

## Laying the Foundation: The Summer Research Institute

*The function of education is to teach one to think intensively and to think critically. Intelligence plus character—that is the goal of true education.* Martin Luther King, Jr.

The Summer Research Institute (SRI) is the point of entry for students who will go on to become ASCEND Scholars. It is a research “training camp” that will be hosted annually by ASCEND faculty and mentors. Students who attend this eight-week workshop-style program will become familiar with the determinants of health, the branches of science that can improve health, the scientific method, and how scientists think and work. The SRI emphasizes and supports critical thinking. By the end of the Institute, students will have written and received feedback on their research proposals. In accordance with the entrepreneurial spirit of ASCEND, students select their own research topics and develop their own proposals.

SRI students are guided by an interdisciplinary team of five faculty members and five near-peer mentors from Morgan State University, the University of Maryland Medical Center, and Johns Hopkins University. Additional guest lecturers from these partner institutions will also present their work during the SRI.

Twenty-nine undergraduate students, almost all from underrepresented minority backgrounds, participated in the inaugural ASCEND SRI from June 3 to July 30, 2015. The program maintained 100% retention. The students made their highly acclaimed final presentations on July 29th. Faculty from MSU, the National Cancer Institute, the University of Maryland, and Johns Hopkins University attended, including MSU's President David Wilson, Provost Gloria Gibson, and Vice President for Research & Economic Development Victor McCrary. The majority of research topics selected by the students focused on health issues at MSU and in the surrounding neighborhoods, thus enhancing the opportunities for close and productive collaboration with our community.



## Building the Next Level: The ASCEND Scholars Program

*So I told [Francis Crick] my research plan. And the first thing he said was, "Have you done the control?" And, of course, I had discovered that [as a student] I didn't know enough science to do the control first.* Bruce Alberts, FORMER PRESIDENT, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS) AND EDITOR, *SCIENCE*

Students who complete the Summer Research Institute have developed an appreciation for the scientific method and proposal writing. However, they do not have the training, skills, and experience to write a polished proposal and conduct a major research project.

Based on their performance, accomplishments, and aptitude for and commitment to research, a select group of the SRI students are chosen as ASCEND Scholars to receive two years of additional, intensive research training. These Scholars will be mentored and supported in polishing their research proposals, submitting them for internal funding, conducting their research projects, and analyzing and reporting their research results. They will receive the full benefits of the ASCEND Program, including tuition support, a stipend, funding for travel, and the best research training available. Scholars will work with faculty mentors to prepare Individual Development Plans. Helping these Scholars achieve their highest potential as biomedical researchers is the primary objective of ASCEND.

ASCEND scholars will be trained by faculty from MSU and its partnering institutions, including the National Institutes of Health, Johns Hopkins University, and the University of Maryland. The first group of ASCEND Scholars were selected on July 31, 2015, and started their two-year intensive program on August 19, 2015.

### SHIRLEY GREEN, ASCEND SCHOLAR

Shirley Green, a Morgan State sophomore, was looking for a research position. She saw the ads for ASCEND but wasn't sure it was for her. She thought that ASCEND focused on bench science, but Shirley was a psychology major. However, as she investigated further, it became clear that ASCEND's broad mission and goals included students with interests in all health-related sciences, including psychology. Shirley was accepted into ASCEND's

**"ASCEND has given me the opportunity to shine, and the drive to pursue graduate school. I know I am much more ready now."**

Summer Research Institute, and was later selected as one of the 20 members of the first cohort of ASCEND Scholars.

Shirley reports that ASCEND's Summer Research Institute gave her a much broader view of health and research. She learned how to find a specific topic that excited her, how to write a research proposal, and how to work with peers on a group project.

"This was a great experience," Shirley said. "I really liked working with the smart and competitive students in our group. I loved visiting Johns Hopkins and University of Maryland. I also liked getting to know the research faculty in Psychology better."

Shirley is looking forward to further developing the proposal that she and her group wrote during the Summer Research Institute, and to conducting the research that it proposes. The title of their project is "Assessing the Effectiveness of an Intervention to Reduce Alcohol Consumption in First Year College Students Residing On or Off Campus at an HBCU."

"I am excited about attending the Annual Biomedical Research Conference for Minority Students in Seattle

this year," says Shirley. "I can't wait to see the presentations. Also, I have never been on an airplane before. So I look forward to that experience as well."

In addition to being an ASCEND Scholar, Shirley is one of the founding members of the ASCEND Student Research Center. As part of these responsibilities, Shirley and the other eight founding members will draft the constitution and bylaws for the Center.

In contrast to her initial impression, Shirley is now convinced that ASCEND is totally for her. She concludes, "ASCEND has given me the opportunity to shine, and the drive to pursue graduate school. I know I am much more ready now."

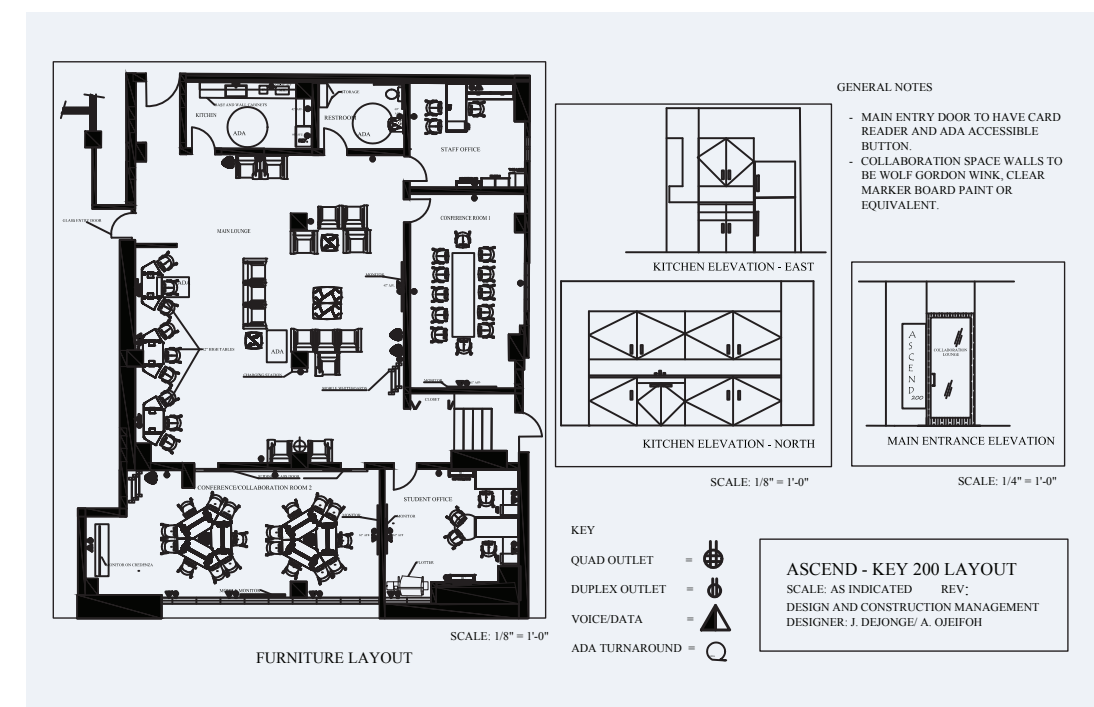
## Enhancing Support: The Student Research Center

*For every one of us who succeeds, it's because there's somebody there to show you the way out. The light doesn't always necessarily have to be in your family; for me it was teachers and school.* Oprah Winfrey

How about your peers, near-peers, and mentors being available to show you the way out?

The Student Research Center will be an environment dedicated to students. It will be a special place where they can develop relationships with their peers and mentors, share and develop research ideas, and plan and launch group activities. The SRC will be for students, about students, and managed mainly by students.

This Center will be physically located in Key Hall in MSU's Science Complex; the space is currently being renovated for its dedicated purpose. Dr. Payam Sheikhattari, the co-Principal Investigator of ASCEND, has significant experience with such research centers and will serve as the SRC Faculty Advisor. Ms. Shamara Martin has been hired to serve as the SRC Coordinator.



Nine students have been selected as the SRC's founding members. They are in the process of writing the bylaws and registering the Center with MSU, according to University guidelines. These founding students, in collaboration with other inaugural student members, will vote to approve the bylaws, elect the first group of officers, and help recruit other student members. It is expected that these activities will be completed and the physical space will be renovated and ready for occupancy by winter 2016. The proposed layout of the Center is shown above.

## Mentoring: One for All, and All for One

*You learn something new every day, and you never know who you are going to learn it from. So pay attention.* Mollie Lange, RESEARCH ASSOCIATE, MORGAN STATE UNIVERSITY

Mentoring is a complex, multi-dimensional task. An ideal mentor should be visionary, knowledgeable, well-connected, approachable, honest yet diplomatic, understanding yet pushing for excellence, a good listener and communicator, a strong supporter, and more.

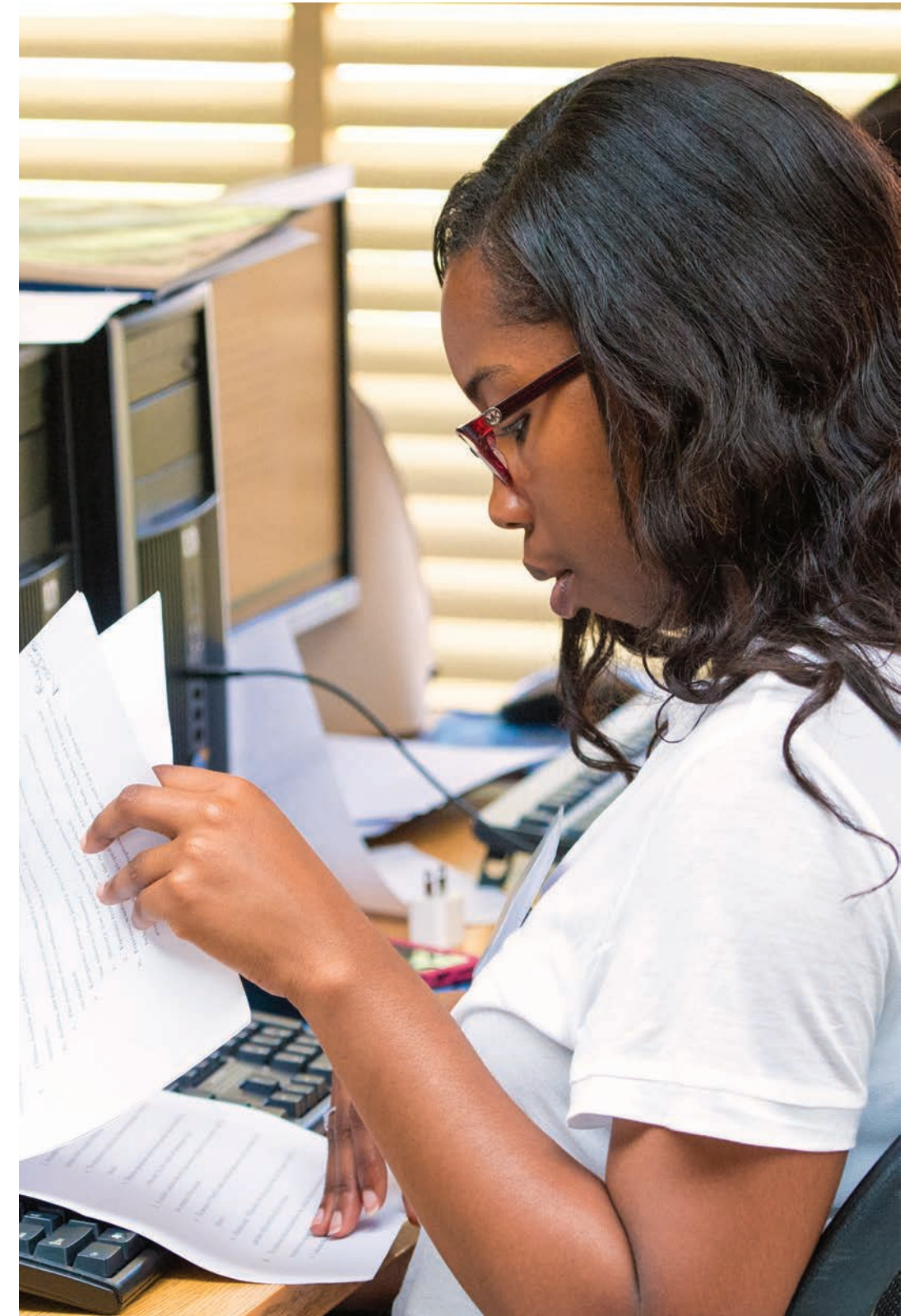
We understand that one mentor cannot possess all of these qualities. But there is no reason that a mentee should benefit from only *one mentor*. Students can learn from their peers, near-peers, and junior and senior faculty. Likewise, faculty can learn from their peers and from students. We can rely on each other for advice, support, connections, and other contributions to our success. With these ideas in mind, ASCEND is establishing a *community of mentors*.

“The traditional one-on-one apprentice mentoring model is a *vertical system* with the mentor (research scientist) at the top, guiding the mentee (graduate or undergraduate student) through the knowledge, skills and mysteries of the discipline. We have designed the ASCEND model to be different from the traditional system. We envision a *horizontal* model in which all participants work in groups focused on student-generated research topics. They will share their expertise to enable the mentees to pursue careers in biomedical disciplines,” said Dr. Carrol Perrino, one of ASCEND’s lead mentors.

To put this model into action, ASCEND mentors have been taking advantage of the resources provided by the NIH-funded National Research Mentoring Network (NRMN). In spring 2015, Drs. Christine Hohmann and Carrol Perrino attended a “train the trainers” workshop conducted by NRMN. Using the exercises, cases, and extensive curriculum provided, Drs. Hohmann and Perrino, along with Dr. Avis Jackson, held a workshop for the instructors and near-peer mentors scheduled to lead ASCEND’s first Summer Research Institute. Highlighted in this workshop were modules focused on communication and group dynamics, especially public acknowledgment of an individual’s constructive and destructive behaviors affecting the group. The same modules were presented in a second workshop for mentors conducted in early summer with participants from Morgan State University, Johns Hopkins University, and the University of Maryland. In these workshops, personal and professional interests were shared, and a cross-discipline and multi-institution community was established.

Feedback from these workshops reflected a need for additional training using other modules available in the NRMN curriculum. Suggestions expressed a desire for case studies relevant to the MSU community. The mentoring leadership team is currently writing scripts and designing role-playing activities to capture MSU’s environment and culture.

The ASCEND Program represents a commitment to multiple innovative approaches designed to engage the entire Morgan community in generating accomplished and enthusiastic biomedical researchers. The mentoring strategies will be essential to this effort.



## *BUILD to Last: Sustaining and Growing ASCEND Beyond the Funding Period*

*I am particularly proud that I am leaving behind an ongoing organization that can live on as a role model long after I am gone.* William Hewlett, COFOUNDER, HEWLETT-PACKARD

As part of the National Institutes of Health's BUILD Initiative (Building Infrastructure Leading to Diversity), ASCEND has been funded for its first five years. This award will support the launch and operation of ASCEND over this period, including the support of many students, and the development of substantial infrastructure for the program at MSU. But it is hoped that ASCEND will last far beyond this initial five-year funding period. How can this be assured?

A highly cited paper by Shediac-Rizkallah and Bone (1998) suggests that sustaining a new program requires: 1) that the workforce and institution are fully equipped and informed (capacity development); 2) that new policies and capacities are institutionalized (institutionalization); and 3) that the quality and effectiveness of the services delivered are continuously improving (quality improvement).

The next few pages summarize our efforts to ensure capacity development, institutionalization, and quality improvement for ASCEND.



## Capacity Building: Faculty Development

*I have great faith in a seed. Convince me that you have a seed there, and I am prepared to expect wonders.* Henry David Thoreau

ASCEND's plans include providing "seed money" and other support to help faculty develop their own research programs and sharpen their research skills. The opportunities to provide this support include funding for pilot research grants, course design and redesign, travel to scientific conferences, and sabbatical funding. In addition, ASCEND will support faculty participation in workshops focused on student-centered teaching, grant writing, and mentoring training. ASCEND will also provide statistical support for faculty research.

**Pilot research grants:** Every year from four to eight awards of up to \$50,000 each will be given to faculty to jump-start or revitalize their health-related research, and to train undergraduate students. Proposals submitted to the ASCEND Program will be reviewed according to predefined criteria by researchers who are external to MSU. In April 2015, ASCEND received 25 applications for pilot research grants. Of these, eight were selected for potential funding and submitted to NIH for further review. It is expected that NIH will make final decisions for funding these selected proposals in autumn 2015.

**Funding for travel to conferences:** Travel awards will serve two purposes. Some awards will allow faculty members to attend meetings focused on enhancing their pedagogical expertise. Other travel awards will support faculty attending scientific meetings in their fields to present their research results, to network with colleagues, and to learn about new developments. In April 2015, ASCEND received 11 applications for travel grants, and funded eight of them.

**Awards to design new courses or redesign curricula:** These awards of approximately \$20,000 each will encourage faculty to make their undergraduate health and science courses more interdisciplinary, research-focused, and appealing to students who may be interested in pursuing careers in biomedical research. In April 2015, ASCEND received 11 applications for these awards, of which six were funded.

**Sabbatical funding:** Every year, one or two faculty members will receive funding for sabbatical leave. This leave from their regular duties will allow faculty to sharpen their health-related research skills and to form productive partnerships with other institutions. Because ASCEND was launched out of sync with the academic calendar, no sabbatical funding was awarded for the first program year.

**Grant writing workshops:** These workshops will teach junior faculty members about the grant writing process, including content development and proper format. To assist interested faculty in preparing their pilot research grant proposals, two three-hour workshops focused on NIH content and format requirements were held in March 2015. More than 30 MSU faculty members attended these workshops.

**Mentoring workshops:** Two members of the ASCEND Team, Drs. Christine Hohmann and Carrol Perrino, attended a "Train the Trainer" mentoring workshop held by the NIH-funded National Research Mentoring Network in February 2015. These faculty members then used their lessons learned to train Summer Research Institute faculty and near-peer mentors in May 2015. A second training for additional ASCEND faculty and collaborators was held on June 19, 2015. A third faculty training workshop is planned for autumn 2015.

**Statistical support for faculty research projects:** Dr. Mian Bazle Hossain, Professor of Biostatistics in the School of Community Health and Policy, is providing MSU faculty with statistical data analysis support for their research projects.

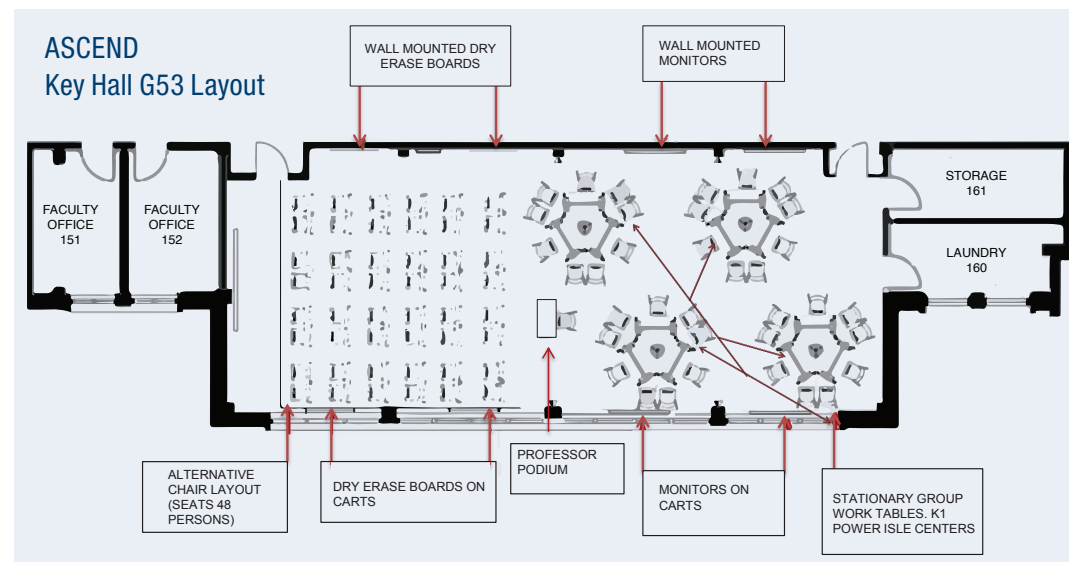
## Capacity Building: Technology, Equipment, and Information

*Life was much easier when apple and blackberry were just fruits.* Anonymous

This might be true! But apple and blackberry are much more than just fruits now. Technology is changing the world, and to succeed, we must adapt.

### Renovations: Everything Old is New Again

Three spaces in Key Hall in the Science Complex have been designated for ASCEND research, training, and teaching, and are being renovated. One area will be designed to serve as the Student Research Center, and the other two will be Active Learning Centers.



The SRC is currently an unoccupied 2800 square foot apartment that requires major renovations. Designs are complete. The SRC will include: office space for the SRC Coordinator, Faculty Advisor, and student leadership; two conference rooms with white-board walls and state-of-the-art communications equipment; a kitchenette; and a lounge space with a laptop bar and moveable furniture to foster group interactions and activities. Renovations are expected to be completed in winter 2016.

The 2015 Summer Research Institute was held in one of the spaces designated as an Active Learning Center (ALC). Renovations of this space are complete. During the academic year, this ALC will be used as classroom space.

A second ALC will be equipped with state-of-the-art technology for biomedical science courses. Neither ALC will be arranged like a traditional classroom, with students seated in rows facing an instructor who lectures from the front of the room. Instead, seating will be arranged in modules that will accommodate six to nine students each. Each seat will have a computer monitor that allows the student to actively interact with the material being presented. The “cluster” seating encourages interaction among the students, including peer-to-peer teaching and learning. When the instructor is present, manipulations of the images on the main screen will appear on all the students’ screens.

Human anatomy will be taught using BodyViz software purchased with ASCEND funds. BodyViz presents the body as a series of 3D magnetic resonance images (MRI). Organs and their relationships can be visualized, enlarged and rotated for viewing from many angles. Histology will be taught using the Biolucida® system from MBF Bioscience, also purchased with ASCEND funds. With Biolucida®, the computer monitor becomes a virtual microscope. Images of tissue sections can be focused, magnified and moved from field to field. The system includes a large collection of images purchased from the University of Iowa’s Teaching Collection. Students can interact with and manipulate the images in BodyViz and Biolucida® as much as they want to understand the form, function, and interactions of the body parts they examine.

ASCEND has developed a relationship with Dr. Craig Ferris at Northeastern University in Boston. Dr. Ferris uses functional MRI (fMRI) as a research tool to visualize areas of animal brains that are active during a variety of behavioral tasks. Functional MRI is a powerful teaching and research tool that can unlock information about the brain that is impossible to learn with traditional techniques. ASCEND has purchased video conferencing hardware and MRI analysis software that will allow students and faculty at Morgan to communicate in real time with the MRI facility at Northeastern. Researchers and students will learn about MRI technology and analysis, and will be able to conduct scans and perform experiments remotely.

These exciting learning and teaching tools are true 21st century technology. They will encourage and support the active student-centered and student-controlled learning that is the centerpiece of ASCEND.





### Shared Research Equipment and Software

ASCEND funds will also be used to purchase equipment and software to enhance health-related research capacity that will be shared across disciplines and departments. MSU's School of Community Health and Policy has acquired software (on behalf of the MSU Interdisciplinary Qualitative Research Work Group) to conduct qualitative data analysis (Atlas.ti and nVivo), and to create portable document format files.

The School of Computer, Mathematical, and Natural Sciences has purchased an Agilent Technologies Cary UV-Vis spectrophotometer that can identify particles and compounds by their absorption of ultraviolet (UV) and visible (Vis) wavelengths. The spectrophotometer is housed in Dr. Kadir Aslan's laboratory in the Dixon Research Building, where it is being used to characterize nanoparticles for use in a variety of applications. Also purchased with ASCEND funds and housed in Dr. Aslan's lab is the Emblation 8GHz, 20W medical microwave, an instrument with research and therapeutic capacity to treat disease in humans.

In addition to the purchase of new equipment, ASCEND has provided funds to repair, update, and maintain existing research equipment in the Science Complex. A Nikon confocal microscope and a laser capture microscope system will be outfitted with new digital cameras and software to capture microscopic images. Research-grade inverted and upright microscopes and a Molecular Devices culture plate reader will be updated and repaired. Numerous other research and teaching microscopes have been cleaned, repaired, and restored to good working order.

### Enhancing Library Resources

ASCEND plans to enhance library resources by supplementing Morgan State's current access to publication databases and online scientific journals. Subscriptions to Scopus and Web of Science (databases of peer-reviewed literature) will be purchased, as well as other resources that the library, faculty, and students identify as helpful in conducting health-related research. Resources will also be acquired to support and enhance student-centered, interdisciplinary and interactive teaching methods.



### Capacity Building: Establishing the ASCEND Center for Biomedical Research

*If you want to go fast, go alone. If you want to go far, go together. African Proverb*

After receiving NIH funding for ASCEND, Morgan State University founded the ASCEND Center for Biomedical Research. This Center hosts the ASCEND Program, but the faculty, staff, and students have an ambitious vision that goes much farther. The ASCEND Center is home to health researchers from various fields, including public health, biology, psychology, and chemistry. It breaks the silos, brings campus researchers closer together, and encourages the productivity and innovation that cross-disciplinary efforts can achieve. Because of its multidisciplinary nature, the ASCEND Center operates under the auspices of the Division of Research and Economic Development rather than any individual school.



“Morgan State University and the ASCEND Center for Biomedical Research have been very successful in enhancing support for students, improving the quality of research, and fostering interdisciplinary collaborations with excellent program oversight and implementation. We are ready and determined to take the next steps to further strengthen research collaborations within Morgan State and with outside partners to affirm the vision of NIH's BUILD initiative,” said Dr. Victor McCrary, Morgan State University's Vice President for Research and Economic Development.

It takes time for scientists from different disciplines to learn each other's terminology and achieve effective collaboration. Finding common research interests and developing those interests into working projects will not happen quickly. But we “want to go far,” and we are determined to break down any barriers or obstacles that would inhibit productive, collaborative work.

## Developing a Culture: Internalization and Institutionalization

*We need to internalize this idea of excellence. Not many folks spend a lot of time trying to be excellent.* Barack Obama

*It takes a village to raise a child.* West African Proverb

Consistent with the West African proverb, it is the philosophy of ASCEND that *it takes an institution to build a scholar*. The foundational strategies of Active Learning Centers, improved student-centered curricula, state-of-the-art laboratory equipment and educational software, faculty support, team-based student-initiated research, and community engagement will increase the likelihood of students going to graduate school and pursuing careers in biomedical research.

As ASCEND draws support from MSU and its partner universities, it will also help MSU to internalize and institutionalize the cultural and pedagogic shifts that drive its mission. This will be done along at least three dimensions. First, ASCEND will *establish a mindset of research excellence* by engaging the campus community in research partnerships and providing opportunities and support for interdisciplinary collaborations. Second, ASCEND will *enhance the skills necessary to achieve excellence* by developing competencies and experience in pursuing novel and innovative research strategies through student-centered pedagogy, and faculty development and support. Third, ASCEND will *sustain a campus-wide culture of research excellence* by ensuring continuing support from the University administration, and actively promoting and incorporating ASCEND into campus life.

ASCEND will become the model program that grows the future and leads the world by producing the next generation of health researchers.

## Continuous Quality Improvement

*Don't bother just to be better than your contemporaries or predecessors. Try to be better than yourself.* William Faulkner

We will continuously strive to be better than ourselves. How else can we ASCEND?

The ASCEND evaluation team—Drs. Trent Haines and Catherine Martin-Dunlop from Morgan State University, and Dr. Keith Maddox from Tufts University—have designed a comprehensive plan for evaluation and quality improvement. The team will apply detailed qualitative and quantitative evaluation tools to determine how successful ASCEND is in the following arenas: helping students reach the hallmarks of success (as set internally and nationally); strengthening the institutional capacity for conducting biomedical research; and revising university curricula to make our students more interested in, familiar with, and capable of conducting biomedical research. The ASCEND Research Team will carefully examine the results of the evaluations and modify procedures and programs accordingly. All results and modifications will be carefully documented.

We expect that these efforts will not only improve the quality of the program, but will also lead to the development of new evaluation tools, such as scales for measuring entrepreneurship and the sense of belonging among minority undergraduate students.

### FROM THE ASCEND FACULTY



**Gloria Hoffman, PhD, Professor of Biology and Director of ASCEND's Institutional Development Core**

"Implementing the simultaneous development of students, faculty, and institutional resources at Morgan State will have an enormous impact on the success of ASCEND, because the results will be greater than the sum of the individual efforts. For students to become tomorrow's leaders in biomedical research, they must be engaged and immersed in a vibrant research environment. The recipe for this environment includes active and well-funded faculty research programs, modern teaching tools and methods, and well-equipped and maintained research laboratories."



**Christine Hohmann, PhD, Professor of Biology and Director of ASCEND's Research Enrichment Core**

"The first Summer Research Institute was an incredibly rewarding experience. In a very short period of time, we saw students advance from novices to young researchers, from passive listeners to active participants. We had high expectations for their presentations at the end of the SRI, and the students exceeded our expectations. They confirmed the theories and our beliefs that giving students the freedom to develop their own research interests and to construct their own bodies of knowledge supports the critical thinking and confidence necessary for success."



**Keshia Baptiste-Roberts, PhD, Assistant Professor of Epidemiology**  
She received an ASCEND travel grant to attend the Teaching Professor Conference in Atlanta in 2015.

"My doctoral training never addressed adult learning, instructional methods, or pedagogy. The Conference discussed strategies to enhance student learning and success. It opened my eyes to many innovative and invigorating methods of teaching. I have already used many of the new teaching tools in my courses. I will be sharing what I learned with other faculty during our upcoming retreat and through the University's newly created Instructional Community of Practice Workgroup."



**Pumptiwitt McCarthy, PhD, Assistant Professor of Chemistry**  
She has been recommended for ASCEND funding of her proposal *Optimizing a Fluorescent Assay for a Neisseria Meningitidis Capsule Polymerase*.

"ASCEND gives undergraduates a graduate school experience. Working with their own ideas, learning to think critically, and wrangling with concepts rather than simply learning techniques, will serve our students well as they move into research careers. A program like ASCEND would have greatly benefited my development as a scientist. ASCEND funding now will allow me to equip my laboratory and add students to my lab as we investigate the biochemistry of *Neisseria meningitidis*, a leading cause of bacterial meningitis, a serious global health threat. This award will also support my applications for continued funding of this important work at higher levels."

## Collaborations with Other Academic Institutions

*Science is a collaborative effort.* John Bardeen, NOBEL LAUREATE

ASCEND has formed partnerships with several research-intensive universities. ASCEND is also a member of the NIH-funded Diversity Program Consortium, a national effort to increase the diversity of the biomedical research workforce. The next few pages describe these academic collaborations.



### Research Partners: We Are In It Together

*Our job is to get results. We know that our results depend on the quality of our partnerships.* Bill and Melinda Gates Foundation

We believe it takes an institution to raise a scholar. In fact, it takes more than one institution to raise a scholar. Our scholars are given the latitude to choose their own research topics. While MSU may not have deep enough expertise in some of these areas of research, Baltimore is home to a number of world-renowned academic research institutions with vast research repertoires and capabilities. We have developed and continue to strengthen partnerships with these institutional neighbors and friends for the training of our scholars.

Researchers from three nearby institutions—Johns Hopkins University, the University of Maryland, and the Intramural Program of NIH—are involved in ASCEND. They have provided guidance, written letters of support, served as members of the ASCEND Steering Committee and ASCEND External Advisory Board, reviewed pilot research proposals submitted by MSU faculty, and reviewed proposals from our Summer Research Institute students. These partner organizations have also committed to help our scholars polish their proposals, accept scholars into their labs and epidemiologic studies, and collaborate with our faculty in conducting research.

“Research suggests that students need a science identity; they need to see themselves as scientists. By giving students the opportunity to self-determine their research area—to be leaders, rather than followers—the ASCEND model gives them self-efficacy and promotes a science identity. We are committed to this effort and we are in it together,” said Dr. Harolyn Belcher, Associate Professor at Johns Hopkins University School of Medicine, Director of the Center for Diversity in Public Health Leadership Training at Kennedy Krieger Institute, and a member of ASCEND’s Steering Committee.

Additional research partners include Tufts University, Northeastern University, and Lehigh University. Tufts faculty and graduate students assist with the evaluation studies that are crucial to ASCEND’s success. Collaborating with Northeastern University allows us to offer the use of functional MRI (fMRI) as a research tool to visualize areas of animal brains that are active during a variety of behavioral tasks. Students and faculty at Morgan will communicate in real time with the MRI facility at Northeastern, and will be able to conduct scans and perform experiments remotely. Lehigh University has agreed to serve as a site for several of our students to do summer research.

These partnerships are integral to our capacity building. We will continue to strengthen these mutually beneficial relationships and develop additional ones.



## Coordinating with Other BUILD Sites and NRMN

*No one can whistle a symphony. It takes an orchestra to play it.*

Halford E. Luccock, AMERICAN METHODIST MINISTER AND PROFESSOR OF HOMILETICS AT YALE DIVINITY SCHOOL



Morgan State University's ASCEND is one of 12 programs funded by NIH to enhance diversity in the biomedical research workforce. Ten of these programs, including MSU's ASCEND, are funded under the BUILD initiative, and focus mainly on training undergraduate students. The eleventh program is the National Research Mentoring Network (NRMN), which provides mentoring, mentor training, and professional development at all levels. Who is the conductor for this symphony of 11 players?

The twelfth NIH-funded program is the Coordination and Evaluation Center (CEC) at the University of California, Los Angeles (UCLA), which coordinates efforts among the other 11 programs, facilitating knowledge sharing and conducting comprehensive program-wide evaluation. The CEC, NRMN, and BUILD compose a consortium that works in concert with NIH.

The CEC and NIH have organized in-person and web-based seminars to share knowledge. ASCEND investigators presented their approach and accomplishments during the NIH kick-off meeting in November 2014, the NIH and CEC site visit to MSU in May 2015, and a CEC web seminar in September 2015. ASCEND's evaluation plans have been developed in collaboration with the CEC, other BUILD sites, and NRMN. Through their close collaboration with the CEC, the ASCEND evaluation team has been extensively involved with consortium-wide efforts to develop an evaluation plan that will expand our knowledge of "what works" for underrepresented minorities in biomedical research training. Areas of collaboration include consortium-wide evaluation planning and implementation, data coordination, and the development of hallmarks for success.

Being a player in this nationwide effort will clearly enhance and improve ASCEND's efforts and outcomes. We look forward to expanding collaborations with other consortium members.

## Vision for the Future: Reaching Beyond the Campus Walls

*As I look back on my own life's work, I'm probably most proud of having helped to create a company that by virtue of its values, practices, and successes has had a tremendous impact on the way companies are managed around the world.* William Hewlett, COFOUNDER, HEWLETT-PACKARD

ASCEND Scholars are Morgan State undergraduate students, and the ASCEND Center for Biomedical Research is located on MSU's campus. But the impact of ASCEND will not be limited by the campus boundaries. Part of ASCEND's mission is to develop a model for teaching and research that impacts higher education in general.

ASCEND will improve the communities that surround universities by engaging with them to identify their most important health problems, and collaboratively planning and implementing research interventions to address those problems. Community-based participatory research (CBPR) relies on these valuable partnerships that support learning through experience. Student-centered, inquiry-driven education is also one of the most powerful ways to attract minority students to research careers. Since our nation's health disparities so disproportionately affect minorities, and because minority students are more focused on researching solutions for the problems of their own communities, ASCEND's approach has the greatest chance of solving our nation's most serious health problems.

The next few pages describe ASCEND's vision and potential for the future, with an emphasis on reaching beyond the campus boundaries.



## Replication on Other Campuses

*We never notate our music, so you can try to replicate it, but you don't really have it.*

Thurston Moore, AMERICAN MUSICIAN

NIH has funded ASCEND, as well as nine other undergraduate programs at other universities, to find ways to increase diversity in the biomedical research workforce. If the program is to have any lasting impact, it should be replicable. Unlike Thurston Moore, we will strive to write down every note and chord and share them. We will share the melodious and the cacophonous.

The ASCEND training model can potentially be replicated beyond the MSU campus, if the following pre-conditions are met. First, the results at MSU need to support the feasibility of the model. As with any other innovative program, we need to have proof that working with student research ideas and turning them into successful projects is feasible. Second, the ASCEND methodological approach and curricula must be rigorously evaluated and gradually improved to a level that is cost-effective and easily adaptable. Third, we must create and sustain a Student Research Center (SRC) that will attract large numbers of undergraduate students to explore research, and that will guide them down a path to become the next generation of outstanding biomedical researchers. We foresee that a successful SRC at Morgan will serve as a model for SRCs at universities around the nation.

The initial results of implementing the ASCEND Program during the first year were quite promising. Despite limited time for student recruitment and the inefficiencies of a first

effort, ASCEND enrolled 29 undergraduate students in the Summer Research Institute and retained all of them. Eight student group projects were developed and presented with levels of quality well beyond the expectations of the review panel. This is good initial evidence that the ASCEND model is feasible. Another sign of success is that 41 students responded to our initial call during the summer to become inaugural members of the SRC. From these inaugural members, nine students were selected as founding members and have taken up the task of establishing and registering the SRC as an undergraduate research organization at MSU.

Replication of the ASCEND Program is a long-term goal and will happen as we learn from our experience and program evaluations. It is our mission to document, publicize, and present the results at each phase. We will disseminate the details of the program and the evaluation results. We will offer training, mentorship, and technical support to any academic institution that wants to join us and adopt the ASCEND training model. The process of program dissemination is now considered a field of research and scholarship in its own right because successful replication of a program at a different institution requires careful consideration of contextual differences and variations. Therefore, through collaboration with interested institutions, we will study contextual factors and generate new knowledge about how to successfully adapt the ASCEND model in environments that may be different from MSU. Specific training workshops and technical assistance will be offered by experienced and talented students, faculty, and staff who want to help others succeed.



## Engaging the Community in Research

*We need to move beyond what too often has been seen as a paternalistic stance. We need to engage the public in a more open and honest bidirectional dialogue about science and technology....* Alan Leshner, FORMER CEO, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)

There is a rightful place for basic science research, which often appears to have relatively little to do with the current, pressing needs of society. Some of today's apparently impractical research may make valuable contributions in the future. Sometimes basic research conducted for one purpose serendipitously becomes useful for other purposes. For example, the drug AZT, which is used to treat HIV, was initially developed in 1964 (before there were any known cases of HIV) to treat cancer. However, in addition to a focus on basic science research, ASCEND is also dedicated to conducting research that directly addresses the immediate needs of our communities, especially our most vulnerable communities.



Engaging the community through research and service is one of Morgan State University's strategic priorities. In 2011, MSU President David Wilson designated the communities that surround the campus as the "Morgan Community Mile (MCM)." He began an active campaign to encourage faculty, students, and staff to work in partnership with local stakeholders to permanently improve the lives, health, and environment of the MCM. ASCEND fully supports faculty and students conducting research that engages the community, particularly the MCM. Fortunately, MSU's faculty and students are highly committed to this paradigm, and many of them are experts in community-based participatory research (CBPR).

CBPR is a partnership approach to research in which academicians and their community partners work hand-in-hand, and on equal footing, to assess the community's most serious problems, then develop and implement scientifically rigorous studies to address those problems. CBPR has the greatest potential to identify, translate, test, and disseminate powerful community-based interventions to eliminate the health disparities that plague our underserved communities. In the process of designing and implementing local solutions to specific problems, these partnerships also generate models that can help other communities across the country and around the world to address their own problems.

As MSU and ASCEND become more visible and better known in our surrounding community, more talented students will choose to join the effort. High school and community college students can become involved in the partnership early in the process by working with ASCEND Scholars who will serve as near-peer mentors. Even students who never attend MSU will benefit from ASCEND introducing them to the importance and value of biomedical research.

To expedite its involvement in community research, ASCEND has joined forces with existing CBPR projects that are already producing valuable results. The story of CEASE, highlighted on the following page, is an example of how powerful CBPR partnerships can be.

**CEASE—Communities Engaged and Advocating for a Smoke-free Environment—is an example of a successful CBPR initiative. As the name implies, the efforts of CEASE are focused mainly on tobacco use prevention, cessation, treatment, and policy change.**



Today's CEASE is rooted in a partnership between Morgan State University and Southwest Baltimore (SWB) that began in 2002 with a collaborative community assessment conducted with Johns Hopkins University. The assessment included interviews with approximately 1,500 residents of SWB about their health conditions and risk factors. Results revealed that 69% of adult males and 49% of adult females smoked

regularly. This was much higher than the smoking rate for the nation as a whole, which at the time was 20% and trending downward. The assessment also showed that the community viewed smoking as one of its most important problems. These results led to an NIH-funded CBPR project to reduce tobacco use, later named CEASE.

Together, MSU researchers and community stakeholders formed a Community Action Board (CAB) to oversee all aspects of the collaboration, including development of the study design, implementation of the intervention, evaluation, and refinements. The CAB decided to implement the first phase of the intervention in community health centers. Cessation services, which included either individual or group counseling sessions, were provided primarily by medical personnel and evaluated using a randomized, controlled methodology. Based on lessons learned from Phase I, the CAB decided to provide only group cessation services, and to move them out of health clinics into churches, schools, and community centers, where services were provided by Peer Motivators (trained residents of the communities they served) instead of professional healthcare providers. The costs for Phase II were lower than Phase I, and the results were substantially better. Smoking cessation rates increased from 10% to 28%, and retention in the program increased from 14% to 52%.

During the past eight years, members of the CEASE partnership have surveyed more than 6,000 individuals, designed and tested four versions of community-based smoking cessation interventions with increasingly better results, launched school-based prevention initiatives including PhotoVoice projects and entertainment education, and mobilized activists to advocate for healthy policy changes. CEASE helped to pass a comprehensive tobacco-free campus policy at Morgan State University (effective July 1, 2015), and provided smoking cessation services to University faculty, staff, and students. In 2014, CEASE hosted its inaugural annual conference to strengthen its relationships with stakeholders, share ideas and disseminate research results to community residents and organizations, scientists, students, activists, and elected officials. This year, in addition to the Second Annual CEASE Conference, CEASE and ASCEND joined together to achieve an even greater impact. In October 2015, ASCEND and CEASE hosted the 2015 Youth Health Sciences Conference, where there was representation from youth-based programs and students from Baltimore City Public Schools.

The accomplishments of CEASE would have not been possible without an engaged community and equal partnership. Community mobilization is what has given this initiative so much power and such impressive results.

## Collaborations with Youth-Focused Agencies

*Youth is wasted on the young.* George Bernard Shaw

Of course, Mr. Shaw was being facetious, or at least not entirely serious. Our youth are the ones who are most profoundly impacted by others, and at the same time are the ones who most profoundly impact our lives. How old were those who invented Microsoft? Apple? Yahoo? Google? Dropbox? How old were the scientists who discovered the structure of DNA? They were all in their 20's or early 30's. And they started on their paths much earlier.

As part of its commitment to training and educating student scientists and providing service to the community, ASCEND has met with multiple youth-focused agencies and organizations, including Baltimore City Public Schools (both the system's administration and several individual schools); JUICE (Juxtaposition Urban Innovation and Cooperative Entrepreneurship); the Community Schools Division of the YMCA of Central Maryland; the Brain Bee; and MERIT (Medical Education Resources Initiative for Teens, Inc.). We are also reaching out to community colleges in our region (e.g., Baltimore City Community College) and across the state (e.g., Prince George's Community College). Many of these relationships are new, and will bloom in the years to come.

ASCEND participates in the Consortium for Urban Education (CUE) STEM workgroup. Members of CUE represent local universities, community colleges, and Baltimore City Public Schools. CUE aims to create a collaborative environment between K-12 and higher education. ASCEND is actively contributing to this initiative. ASCEND's mission to recruit promising students aligns with CUE's mission of giving K-12 students better access to higher education. CUE is working to develop a framework for integrating STEM learning experiences for younger students, to identify a grand challenge to guide all STEM-related activities, and to select anchor tasks for each area of study and grade level.

ASCEND and CEASE partnered with Baltimore City Public Schools to convene a youth health sciences conference in October 2015 at Morgan State University. More than 200 middle and high school students and 50 adults (principals, teachers, parents, and program staff) participated. The purpose of this conference was to generate enthusiasm among youth to pursue careers in medicine, the health sciences, and health research. (It won't hurt if they become better acquainted with Morgan State University!) Intended to be both instructive and engaging, the conference featured DJ 5 Starr (a DJ who specializes in STEM), an ASCEND Scholar who is also a slam poet (who served as the master of ceremonies), Dr. David Wilson (President of MSU), and leaders from the Baltimore City Health Department and Baltimore City Public Schools. There was even a performance by the Morgan State University Magnificent Marching Machine's Drum Line to help "drum up" enthusiasm. Most important, student participants formally presented some of their own science projects to each other, inspiring future research and building self-confidence.

We will continue to reach out to youth-focused agencies, and to solidify these relationships. We are determined to help budding researchers ASCEND!



# ASCEND by the Numbers

## STUDENTS

**29** undergraduate students participated in the first ASCEND Summer Research Institute (SRI).

**8** group research proposals developed and presented by ASCEND SRI participants; six selected for implementation.

**20** undergraduate students selected to be members of the first cohort of ASCEND Scholars.

**9** undergraduate students selected to serve as Founding Members of the ASCEND Student Research Center.

**41** undergraduate students became Inaugural Members of the ASCEND Student Research Center.

## FACULTY

**2** grant writing workshops offered to Morgan State faculty members applying for ASCEND pilot research grants.

**25** ASCEND pilot research grant proposals submitted by Morgan State faculty members.

**40** faculty experts from across the U.S. and Canada reviewed the ASCEND pilot research grant proposals.

**8** ASCEND pilot research grant proposals sent to National Institutes of Health, which will make final selections for grants.

**11** course redesign applications submitted by Morgan State faculty members; six were awarded.

**11** travel applications submitted by Morgan State faculty to attend conferences to enhance their pedagogical expertise, or to attend scientific meetings in their fields of research; eight were awarded.

**7** faculty members have received statistical data analysis support from Dr. Mian Hossain, Professor of Biostatistics in the School of Community Health and Policy.

**2** mentoring workshops held for 30 faculty members and near-peer mentors from Morgan State, Johns Hopkins University, and University of Maryland.

## INSTITUTION

**8** (out of nine) of Morgan State's Schools and Colleges participated in ASCEND-related activities.

**3** spaces within Morgan State's Science Complex being renovated to form two Active Learning Centers and a Student Research Center.

**6** requests for shared equipment or software submitted by faculty members; four awarded.

**3** highly-advanced technologies (BodyViz, functional MRI, and Biolumina®) available for student training and faculty research.

**1000s** of journals, previously inaccessible, will be available online through Morgan State's library.

**6** research partner institutions (Johns Hopkins University, University of Maryland, National Institutes of Health Intramural Program, Tufts University, Northeastern University, Lehigh University) work with Morgan State in various ways, including training and mentoring students.

## THE ASCEND TEAM

### PRINCIPAL FACULTY

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**AC:** Administrative Core; **CLA:** College of Liberal Arts; **IDC:** Institutional Development Core; **REC:** Research Enrichment Core; **SCHP:** School of Community Health and Policy; **SCMNS:** School of Computer, Mathematical, and Natural Sciences; **SEUS:** School of Education and Urban Studies; **STC:** Student Training Core.

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**AC:** Administrative Core; **IDC:** Institutional Development Core; **REC:** Research Enrichment Core; **SRC:** Student Research Center; **STC:** Student Training Core.

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**CLA:** College of Liberal Arts; **JHSPH:** Johns Hopkins Bloomberg School of Public Health; **SCHP:** School of Community Health and Policy; **SCMNS:** School of Computer, Mathematical, and Natural Sciences; **SE:** School of Engineering.

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