

2015-2016

CAREER
HOWARD COUNTY PUBLIC SCHOOLS
ACADEMIES
APPLICATIONS & RESEARCH LABORATORY

Applications & Research Laboratory

10920 Clarksville Pike
Ellicott City, MD 21042

410-313-6998

<http://arl.hcpss.org>



"Extraordinary Learning Through Experience"

Mission Statement

The centralized academies at the ARL will engage students through real-world experiences and 21st century industry standards to be college and career ready, empowering lifelong learners and qualified professionals who will thrive in a dynamic world.



Howard County Public School System

ARL 2015

Centralized Career Academy Programs

The philosophy behind the Howard County Career Academy Program is to prepare students for careers, rather than jobs or employment. It provides students with the opportunity to work and learn in three settings, or campuses: their home high schools, the Applications and Research Laboratory, and the professional work force. The program offers students an opportunity to:

- meet and work with professionals from career fields
- conduct individual and group research projects
- participate in mentorships and internships in business settings
- work in specialized laboratory settings
- explore multiple career options
- build an academic foundation and skill base to be college and career ready.

Instead of replicating work place conditions within the school setting, the program expands opportunities in the community for students to get real-world experiences for all aspects of the workplace through internships.

The following centralized career academies are located at the ARL. Information about this year's program can be found on the page listed.

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HIGHLIGHTS

Career Academies @
The Applications & Research Lab
10920 Clarksville Pike
Ellicott City, MD 21042
410-313-6998
arl.hcpss.org
Administrator - Rick Robb

Program Options

The Career Academy Program consists of nine clusters, each of which contain programs for students in regular or advanced course sequences.

- Arts, Media, and Communication
- Business, Management and Finance
- Construction and Development
- Consumer Services, Hospitality and Tourism
- Health and Biosciences
- Human Resource Services
- Information Technology
- Manufacturing, Engineering and Technology
- Transportation Technologies

The Applications and Research Laboratory (ARL) is the Career and Technology High School for Howard County Public Schools. The ARL offers centralized academy programs in unique content areas with many opportunities for internships and real world experiences. Business partnerships and advisory boards are pivotal in the success of these programs. Students from all 12 high schools and Homewood are able to enroll in programs at the ARL. Each academy is a two-year program intended for juniors and seniors and bus transportation is provided for students between their school and the ARL, allowing students to participate in all after school extracurricular activities. In addition, students are able to use industry standard software and technology to study material at an in-depth level. Students are able to earn industry certifications and college credits while attending the ARL which helps prepare them for success in college and careers. The ARL is located on Rte 108 next to the Howard County Board of Education. Please contact us at (410) 313-6998 or visit arl.hcpss.org if you have any questions.

CAREER ACADEMIES @ THE ARL

June 2015

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Academy of Finance

Instructor: Maddy Halbach, PhD

Academy of Finance II

Seniors in the Academy of Finance worked to modify and implement their business plan for a school store. They operated the store until they went out to their internship sites. Their internships included working for The Collaborative Law Group, Ameriprise, Howard County Center for Entrepreneurship, Corridor Mortgage, RetirementQuest, Howard County Government, and Ascend One. They also took Accounting I during the fall at Howard Community College, which all students successfully completed. They all passed the NAF Track certification. They researched the current financial markets in the global economy while learning investment strategies, learned management accounting, and international business. Seniors also participated in a Dining Etiquette workshop provided by the International School of Protocol and the dining experience provided by the ARL's Hotel and Restaurant Management Program.



Under a Grant that was awarded by the Bright Minds Foundation the Seniors created and conducted financial literacy workshops for 8th grade students in the county. Assessments indicated that there was a 30% increased awareness in financial literacy during this event.

Senior's competed in the state's Personal Finance Challenge held by the Maryland Council for Economic Education and competed with 23

other teams, placing 1st in the State, and 6 out of 23 states nationally.

Seniors upon graduation were awarded numerous scholarships including scholarships from the AOF advisory board members:

- \$2,000 Bank of America/Merrill Lynch
- \$1,000 Sandy Spring Bank
- \$500 Howard County Education Federal Credit Union
- \$500 Making Change: A Financial Wellness Center
- \$250.00 RetirementQuest
- \$2,500 private scholarship
- \$250.00 AOF Instructor

All seniors are continuing on to college and will be attending the following schools to study business and/or finance: Howard Community College, Michigan State University, Pennsylvania State University, Salisbury University, State University of New York – Maritime, and University of Pennsylvania - Wharton.

Academy of Finance I

Junior AOF students studied the current global economy while learning the basics of Macroeconomics. They learned the particulars of having a sole proprietorship business and the full accounting cycle for one year, using Connect as their accounting program with some excel. They learned interviewing skills, public speaking, creating resumes, and how to conduct themselves in a professional meeting. They participated in AOF advisory board meetings by presenting current economic issues and their thoughts on how to resolve them and also participated in round table discussions on using soft skills in the workplace. They participated in special events such as: Aggie Boats—a TQM simulation, the Stock Market Game, the Spring AOF conference, Myers Briggs Personality Type Testing, and workshops conducted by advisory board members in the field of finance, accounting, and economics. They worked with mentors on special projects, such as John Hauserman from RetirementQuest for the Personal Finance Challenge, and Mimi O'Donnell from Leadership Howard County for developing leadership skills and how to use Roberts Rules. Students have also been placed on local charity and nonprofit executive boards.

Placing 2nd, Junior teams competed in the State's Personal Finance Challenge held by the Maryland Council for Economic Education and competed with 23 other teams. They also participated in SkillsUSA



2015 HIGHLIGHTS

Entrepreneurship category and placed 3rd in the state.

Both seniors and juniors analyzed mutual funds and stocks using technical stock analysis models and annual reports, and determined stock and mutual fund selections based on this research. This type of analysis required students to synthesize information from a range of sources, resolving conflicting information when necessary. Students designed portfolios that were diversified and in accordance with their customer's investing philosophy. All students played the stock market game in teams. They also participated in the AOF Spring Business Conference held at the John Hopkins University – APL.



Extracurricular Activities

Extracurricular activities that occurred during the year where students from both classes had the opportunity to participate included:

- A visit to Sandy Spring Bank and the Baltimore office of the Federal Reserve Bank of Richmond.
- Attend a Wizards game in Washington, DC.
- An invitation to watch a Basketball Game in the SECU Box at the SECU Arena, Towson University.
- Participate in a summer panel discussion on the millionaires club in Hunt Valley, MD.
- Participate in a national conference on a panel discussion in Dallas, Texas.
- Participate in a Financial Literacy Workshop for middle school student at the Howard County Library.
- Participate in a Money Matters Financial Literacy event held by Making Change.
- Participate in library nights and open houses representing the AOF program.
- Attend a Howard County Chamber of Commerce breakfast event.

Highlights

- Was recognized as a Certified Academy by the National Academy Foundation
- Won the Millionaire Club Award for the State.
- Won a grant from BrightMinds Foundation to implement the 8th grade initiative.
- Implemented the grant awarded by Discover for Synchronous Video, teaching financial literacy to 300 10th grade students in the County.
- Arranged and participated in a synchronous workshop with students from Franklin College, England.
- The instructor co-presented at the AOF statewide workshop on aligning CEE lessons with AOF curriculum
- The instructor co-wrote an online financial literacy course for the state of Maryland.
- The instructor participated in an advanced Stock Market Game workshop.
- Instructor continues to participate on the SIT committee assisting the school in achieving its goals is also on the Events and Fundraising committee. This committee created a mentor recognition and celebration event.



CAREER ACADEMIES @ THE ARL

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Academy of Health Professions

The Academy of Health Professions provides a purposeful academic and performance-based program that focuses on critical thinking, technical proficiency, and information technology applications in the health care industry. The program prepares students to be career or college ready in the health care industry. The Academy of Health Professions has three pathways. All students take both first year classes, Foundations of Medicine and Health Science, and Structure and Functions of the Human Body. Students then have the option of participating in Clinical Research in Allied Health, Certified Nursing Assistant, or Emergency Medicine Technician.

Foundations of Medicine and Health Science, and Structure and Functions of the Human Body

Instructors:

Mary Anderson, BSN, RN
Victoria Castleman, BSN, RN
Jeffrey Fisher, MS
Kathleen Jones, RN, MS
Elizabeth McIntyre, MAS, BSN, RN, LMT, NCTMB

During this school year, students were taught the anatomy and physiology, pathophysiology and disease conditions of several body systems plus the types of healthcare professionals specifically working in that field. Students did multimedia presentations on a variety of pathological conditions, compiled a portfolio of health related artifacts and practiced performance skills to enhance their learning. In addition, students were challenged to learn medical abbreviations and terminology. This course provides each individual student with a strong foundation of healthcare knowledge for a future in healthcare industry.

Guest Speakers

- Ms. Carol Haislip- Etiquette Speaker
- Current EMT students explained the EMT Academy to the junior students
- Mark Hardin - Animal Bites and Stings Treatment Options

Competitions

The ARL SkillsUSA Chapter was in its second year and it continues to grow. The Academy of Health Profession's students, with Mr. Fisher as their coach, competed in the 2015 Maryland State SkillsUSA Championships in Baltimore. The students competed individually in Medical Terminology and as teams in the Health Knowledge Bowl. Students placed 4th and 5th in the Medical Terminology area as well as the Health Knowledge Bowl.

Certifications Earned

The students earned the following certifications:

- Basic First Aid- National Safety Council
- Cardiopulmonary Resuscitation (CPR)- American Heart Association- Health Care Provider

Teacher Accomplishments

Ms. Elizabeth McIntyre Member, National Sigma Theta Tau (Nursing Honor Society)

- American Heart Association BLS Instructor
- Licensed in MD and PA as a registered nurse
- Licensed in MD and PA as a massage therapist
- Completed PA mandatory Nursing Continuing Education course, 30 CEUs
- Published an article entitled "Massage and Anterior Hip Replacement" in the *American Massage Therapy Journal*, Winter 2014
- Selected to the Volunteer Advisory Board in working with the International Massage Therapy Credentialing Council, Inc.

Mrs. Mary Anderson

- Serves on the American Heart Association Leadership Development Committee
- Acts as coordinator of the HCPSS Coaches CPR training program, trained over 180 athletic coaches
- Licensed in MD as a registered nurse

Mrs. Kathleen Jones

- American Heart Association BLS Instructor
- Licensed in MD as a registered nurse

Ms. Victoria Castleman

- Licensed in MD as a registered nurse

Mr. Jeffrey Fischer

- Co-chair of ARL's SkillsUSA Chapter 2014-Present

Clinical Research In Allied Health

Instructors:

Jeffrey Fisher, MS
Kathleen Jones, MS, RN
Victoria Castleman, RN, BSN



Megan Murray and Montana demonstrate how therapy dogs can be used in healthcare.

Clinical Research students participated in off-campus internships including local and regional hospitals, a pediatric office, physical therapy offices, pharmacies, senior centers, day care centers and other health care facilities. Students were taught research and technical reading and

writing, pharmacology, maternal and child health, physical rehabilitation, review of body systems, and global health issues. Students completed comprehensive research papers, two public oral presentations, and a poster display.

Our students work with older consumers of health care by continuing the intergenerational events with senior citizens from local senior centers. Several events were held at the ARL in collaboration with the Hotel & Restaurant Management Academy. Lunch and programs were planned and led by the students – including pumpkin decorating and a spring craft. A “Senior Prom” at North Laurel Senior Center was held with students and senior citizens from around the county featuring dancing to big band sounds and lunch. A field trip was taken to the Maryland University of Integrative Health to explore multiple alternative/complimentary healing practices.

Two students took an independent course called Pass Assured to prepare them to take and pass the Pharmacy Technician Certification Board exam.

Field Trips

- North Laurel Senior Center
- St. Agnes Hospital
- Laurel Regional Hospital
- Howard Community College
- Maryland University of Integrative Health

Special Activities

- Guest Speaker: Sarah Sherman, RN – Clinical Program Manager, Howard County General
- Participated in a health fair at North Laurel Community Center
- Guest Speaker: Frank Luthardt- Research Subjects Advocate, Johns Hopkins University School of Medicine
- Guest Speaker: Sally Long, “Use of Therapy Dogs in Healthcare”

2015 HIGHLIGHTS

Certifications Earned

- HIPAA (Health Insurance Portability and Accountability Act)
- Blood/Airborne Pathogens- National Safety Council

Internships

Community Member	Site
Sherman, Sarah	Howard County General Hospital
Cole, Marvena	University of Maryland Medical Center
Slofsky, Michelle	St. Agnes Hospital
Nicholas, Valerie	Laurel Regional Hospital
Beth Markowitz	Sinai Hospital Center
Woodard, Amy	ARL Greenhouse
Agwuna, Ruth Dr.	Dr. Agwuna Pediatrics
Selina Gray, Mary-Beth Yelen, Mary Jane Sacker	Cedar Lane School
Djeter, Gretchen & Britney Lucas	Columbia Academy
Carney, Kelly	East Columbia Preschool
Schanilec, Laura	Life Fitness PT Elkridge
Dulaney, Karyn	Life Fitness PT Columbia
Olsen, Trisha	North Laurel Center
Galligan, Terri & Spicer, Ron	Physiotherapy Associates
Hebner, John	VCA Lewis Animal Hospital
Pattee, Chad	Prosports Care and Rehab
Perone, Tom	Orthopedic Associates of Central MD
Campbell, Shinina	Heartlands
Gallagher, Angela	Primary Pediatrics
Brown, Ken	Centennial Medical Plan
Fein, Richard	Advanced Root Canal Specialties of Howard County
Katkow, Eric Katkow, Eric	Katkow Dentistry
Blair, Sufiya	Harmony Hall
Woods, Sandra	PIVOT PT

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Senior Future Plans

Every Clinical Research senior has chosen a two or four year college and a health related major including nursing, pre-dentistry, pre-physical therapy, biology, pre-pharmacy, business, exercise science/kinesiology, physician assistant and pre-med. Students plan to attend:

- Duquesne University
- Goucher University
- Howard Community College
- Howard University
- LaSalle University
- Palm Beach Atlantic University
- Penn State University
- Salisbury University
- Southern Adventist University
- Stevenson University
- Towson University
- University of Florida
- University of Georgia
- University of Maryland, College Park
- University of North Carolina
- University of Pittsburgh
- University of South Carolina
- Washington College

Academy Highlights

- Emphasis was placed on technical writing and research skill. A number of reading and writing challenges for close reading and argument writing were included.
- Evidence-based practice was highlighted in research activities.
- Instructors continue to participate in the MSDE Academy of Health Professions Curriculum Task Force meetings and professional development sessions.

A current needs assessment continues to revolve around finding creative ways to meet the needs of a diverse student population as the Academy grows. The job outlook for health careers is good. We continue to collaborate with Howard Community College and other members of our advisory committee to enhance our specialized areas/course in the senior level as well as concurrent enrollment opportunities in the Academy of Health Professions. We continue to emphasize academics, study skills and real application of content.

Certified Nursing Assistant

Instructors:

Mary Anderson, BSN, RN

Elizabeth McIntyre, MAS, BSN, RN



The Certified Nursing Assistant (CNA) pathway is a second year course option for the Academy of Health Professions. The CNA course provides a purposeful academic and performance-based program within the classroom and clinical setting. Students are prepared for demonstrating standards of care as defined by the

State of Maryland Board of Nursing. Students learn the core concepts of providing nursing care to residents/patients within a variety of healthcare settings. The program prepares students to enter the workplace as well as to become college ready in the healthcare field. The course prepares students to qualify for an additional, optional certification: the Geriatric Nursing Assistant certification to become a GNA.

During this school year, students were taught the basic care needs of residents and patients, communication skills, strategies for dealing with cultural diversity, CAM modalities, and medical terminology and abbreviations. In addition, the students mastered the 22 skills required by the Maryland State Board of Nursing. This course provided each individual student with a strong foundation of knowledge for a future in as a CNA, nurse, or other types of healthcare providers.

CNA Highlights

- 30 students received the CNA certification
- 9 students received the GNA (Geriatric Nursing Assistant) certification

Field Trips

- Students did 6 shadowing observations at the Morningside Assisted Living Facility (Ellicott City, MD) and at Harmony Hall Assisted Living Facility (Columbia, MD)
- Students were oriented to their weekend clinical site – Encore At Turf Valley Rehabilitation and Nursing Facility (Ellicott City, MD)
- Students toured St. Agnes Medical Center (Baltimore, MD), Howard County General Hospital (Columbia, MD), Cedar Lane School (Columbia, MD) and Maryland University of Integrative Health (Laurel, MD)

Certifications

- Maryland Board of Nursing Certified Nursing Assistant
- American Heart Association Health Care Provider
- Cardiopulmonary Resuscitation (CPR)
- HIPAA

- National Safety Council Blood borne and Airborne Pathogens Course

Guest Speakers:

- Andrew Benson, CRNA
- Veronica Gutchell, CRNP
- Sally Long, Pet Therapy
- Gilcrest Hospice Care
- Howard County Health Dept
- Carol Haislip– International School of Protocol
- The Living Legacy Organ Donation Organization
- Howard County General Hospital Human Resources Department
- Mark Hardin, Howard County Public Schools Entomologist

Senior Future Plans



Graduates are planning to attend the following colleges/universities: Benedict College, California State University, Howard Community College, Howard University, Lincoln University, Long Beach City College, Messiah College, North Carolina A&T University, Radford University, Salisbury State University, Stevenson University, University of Maryland Baltimore County, U of MD College Park, York College.



2015 HIGHLIGHTS

Emergency Medical Technician

Instructor: Ken Brown, NREMT-P



EMT is a very demanding pathway. This year 18 students achieved a passing grade for the EMT Academy for the HCPSS. 13 students will be taking their final National Registry Computer

Adaptive Test over the summer. All 13 passed the Practical portion of the process in early May. The students attended class for 6 hours each day when school was closed to other students for Professional Development days in addition to the first 2 periods each day at the ARL.

In December we held a “Family Night” where family and friends of the students came to observe (and at times be patients) as the students showcased their new emergency medical and trauma skills. All students obtained CPR / AED for Health Care Provider training.

Students spent many hours outside of regular school hours riding Howard County Department of Fire and Rescue Services ambulance and paramedic units gaining very important exposure to the “real world” of the EMT. The students functioned and rendered emergency care under the close supervision of seasoned EMS Providers.

A “Graduation Ceremony” was held in early May for the EMT Academy students. It was well attended by friends, family, ARL staff, Executive Officers of the Howard County Department of Fire & Rescue, Howard Community College representatives as well as prior alumni students. The evening was very nice for all of those involved.

We anticipate 6-7 students who complete their final testing this summer will be attending the Paramedic Associates degree or Paramedic Certificate program at Howard Community College. Some are already taking summer classes at HCC. Some students will be exploring other career opportunities and furthering their education and experiences elsewhere.

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Architectural Design Academy

Instructor: Terry Walker

Courses:

Architectural Design

Advanced Architectural Design

The Architectural Design Academy at the ARL prepares students to compete for acceptance to a college architecture program and provide a solid foundation for students that wish to enter the field after graduation from high school. The course introduces the basic principles and methods of design as applied to architecture. Basic design theories and strategies related to the development of spatial concepts in architectural design, including composition, form, and relationship of elements will be applied in the development of 2-D and 3-D design projects. This course further emphasizes the architectural design process and how you go from a creative inspiration to a complete, real, and valuable outcome while relating these principles to general construction practices.



During this school year students of the Architectural Design Academy were challenged by various projects this year which taught the science of a building. Early in the year seniors began working on their capstone project which was a design problem that was to be presented to a panel of nearly 30 architects at the Architectural Showcase. This project proved to be a major success for both the panel and the students. The event also prepared the students for their upcoming internships. The year concluded with many successes such as, great designs, presentations, internships, and certifications.

Field Trips

- Frank Lloyd Wright's Guggenheim
- KPF Architects – New York City

Architecture I

- Collaborative project with Construction Management Academy for house project.
- Various local architects have visited class to critic work.
- Micro-living cube project.
- Birdhouse project in the style of a famous architect.

Advanced Architectural Design

- Students presented their project at AIA Baltimore Design Excellence Awards.
- Collaborative project with Animation Academy for Sr. capstone project.
- Collaborative project with Hotel and Restaurant to develop floorplans and 3D model of hotel/casino and restaurant for their capstone presentation.
- Participated in the Architectural Showcase where the students presented their senior design project to approximately 30 local architects.
- Generated 3D models for local architectural firms.

Certifications

10 Students earned their AutoCAD Certified Users (ACU) Certificate: Rene Cerna, Danielle Dolbow, Anthony Gutierrez, Morgan Stahl, Christopher Vargas, Michael Vogelsang, Anastasiya Volkova, Haley Walker, Chad Whitelock, and Kira Zelnosky

Internships

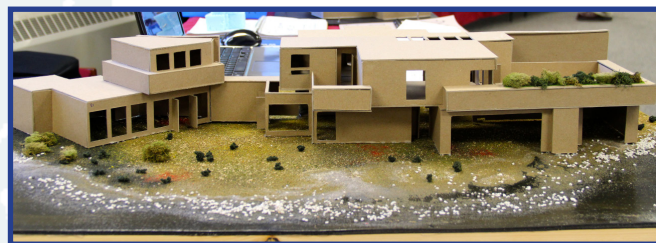
- Transforming Architecture, Karen Pitsley
- Symmetry First Architects, Kate McCullough
- d w taylor assoc., Don Taylor
- OLBN, Tina Li
- Torti Gallas, Grayson Goon
- Probuilt Construction, Edward Pacylowski

Senior Future Planes and Scholarships

- Danielle Dolbow received partial scholarship to attend SCAD.
- Most are entering into Schools of Architecture

Teacher Accomplishments

Terry Walker completed his SPCII, recertified in AutoCAD and Revit, and was voted class of 2015 ARL teacher of the year.



2015 HIGHLIGHTS

Automotive Technology Academy

Instructors:
Jerry Burns
Tom Dearstine
Shawn Stanley

The Automotive Technology academy combines technical, academic and workplace skills in an integrated curriculum in accordance with all National Automotive Technicians Education Foundation, Inc. (NATEF) guidelines. This academy prepares students for further education and careers in automotive technology and consists of four required areas of study for program certification: suspension and steering, brakes, electrical/electronic systems, and engine performance. Each area provides the student with the knowledge and skills necessary to pass the NATEF end-of-course assessments and immediately enter a career in this area and/or attend postsecondary education and/or training. Students develop diagnostic, technical and academic skills through classroom instruction and hands-on maintenance applications. Through theory and real-world experiences, students master the concepts and the ability to identify and perform necessary troubleshooting and repair tasks.



Architecture should speak of its time and place, but yearn for timelessness.

Frank Gehry

<http://www.brainyquote.com/>

Field Trips

Universal Technical Institute - Exton, PA
<http://www.uti.edu/>

Universal Technical Institute provides an education to professional transportation technicians. Everything from diesel and motorcycle technology, to refrigeration and NASCAR development are offered at this school. Student had the opportunity to discover some of these options, and what UTI can offer them as graduates of our program.

Volvo Powertrain North America and Pittsburgh Institute of Aeronautics – Hagerstown, MD
<http://www.pia.edu/>
<http://bit.ly/1Bji3Hy>

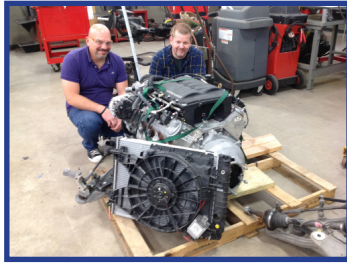
Students visited the Volvo and Mack powertrain

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plant where career options where showcased to our students. Transmissions and diesel engines are manufactured at this plant. Our students were able to witness this process, and to see many

of the other career opportunities available by being employed with this worldwide company.

Activities

Automotive Technology I

The annual service clinic provided the first year students with an opportunity to showcase what was taught the first year. Students had to perform in a



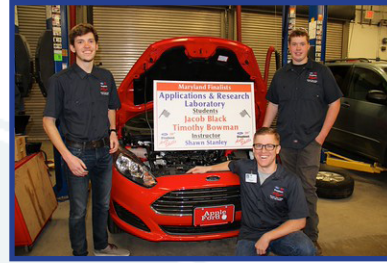
fast-paced, professional service-like environment where they had to give vehicles a service inspection and interact with the public about what was found during this inspection.

Automotive Technology II

- Transmission replacement – Volvo 240
- Timing chain replacement – Saturn
- Engine replacement – Mazda 3
- Clutch replacement – Ford Mustang

Competitions

Timothy Bowman and Jacob Black participated in the Ford / AAA Auto Skills Competition. (<https://autoskills.aaa.com/web/aaa/home>)



They placed 5th in the state competition. Each student was awarded over \$10k in post-secondary scholarships

Internships

- Town and Country Auto Repair
- Hillmuth Certified Automotive
- Apple Ford
- Howard County Fleet Services
- Pine Orchard Sunoco
- ICON Automotive
- T&C
- BMW of Catonsville
- Neubauer's Auto Repair
- Daisy Auto Care

Senior Scholarships

Tucker Willis articulated to Penn College which allowed several thousand dollars in tuition savings.

Timothy Bowman and Jacob Black (see above).

Senior Plans

- Community College of Baltimore County
- Pennsylvania College of Technology
- University of Maryland, College Park
- Howard Community College
- United States Marine Corps

Teacher Accomplishments

- Instructors completed NC3 training with the Snap-on EEDM504D digital multi-meter.
- Automotive Technology curriculum was aligned with Common Core State Standards and NATEF student certification standards.
- Professional ASE technician credentials were maintained by the academy instructors.

Biotechnology Academy

Instructors:

Cindy Kelly, MS NBCT
Jennifer Walker, MS NBCT
Cindy Coffman, MT (ASCP)

Biotechnology I G/T and Biotechnology II G/T provide a framework for careers in medicine, pharmacology, forensics, agri-cultural science, and all biological sciences. Students learn cell and molecular biology (DNA, RNA, proteins) and the related lab techniques. This academy focuses on analysis of scientific data that the students generate, rather than idealized data as seen in textbooks and electronic models of experiments. Students use modern laboratory equipment to perform cutting edge experiments. They diagnose diseases, genetically modify an organism, analyze crime scene evidence, and produce, purify and analyze protein from bacterial cells. Students develop their skills in applied technical writing and applied mathematics.

Field Trips

- Maryland State Police Forensic Science Division Laboratories - Students toured the facilities and spoke with Forensic Scientists in the Biological Sciences, Trace Evidence, Forensic Chemistry, and Firearms and Tool Marks divisions. Students were able to explore the actual duties and responsibilities of scientists employed in Criminal Investigations and Evidence Analysis.
- Washington Suburban Sanitary Commission Patuxent Water Treatment Plant - Students visited a working water treatment plant to observe chemical and biological treatment of wastewater. Students participated in quality assurance analysis of water being treated.

Special Activities

Biotechnology I G/T

- Mock crime scene analysis
- Dr Ramon Jordan, USDA scientist, lectured on viral disease and RNA and applications to agriculture
- Alumni presented on college and career expectations and experiences
- Several students attended UMBC undergraduate symposium



Biotechnology II G/T

- On-campus students participated in the Johns Hopkins Waksman Student Scholars Program
- On-campus students participated in the Howard County Brain Bee (Neurobiology)

Biotechnology II students presented research findings in several settings:

2015 HIGHLIGHTS



- Howard County STEM Fair (Win)
- Johns Hopkins Waksman Student Scholars Poster Symposium

Publications

Several mentored students completed experiments likely to be included in peer-reviewed scientific journals.

On-campus Biotechnology II students had their annotated cDNA sequences published in the internationally available GenBank database.

Internships

- United States Department of Agriculture (USDA)
- Institute of Marine and Environmental Technology (IMET)
- University of Maryland School of Medicine (UMSOM)
- Johns Hopkins Bay view
- University of Maryland, Baltimore County (UMBC)

Scholarships

- Adil Virk – Provost 4 Year Scholarship to Penn State University
- Linda Wiratan – Centennial Scholarship to UMBC
- Thomas Wissman – Warren Miller Delegate Scholarship

Awards

Sam Zarcone - Howard County Stem Fair Mentored Category Sweepstakes Winner

Linda Wiratan - Howard County Stem Fair Mentored Category Second Place

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students entering grades 8-10.

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Adil Virk - Brain Bee second place winner

Senior Future Plans

- University of Maryland, Baltimore County
- University of Maryland, College Park
- St. Mary's College of Maryland
- Howard Community College
- Delaware State University
- Delaware Valley University
- Pennsylvania State University
- Mount Holyoke College
- United States Army



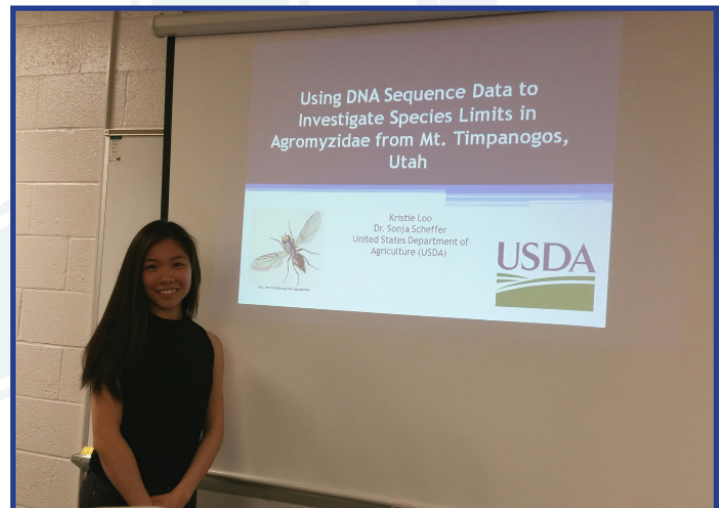
Presentations

Each second year student completed a final research report and final presentation to community, teachers and parents.

Students volunteered throughout the year at open house presentations, local elementary school science fairs, and outreach events.

Teacher Accomplishments

- Presentations were made to Howard County and state wide groups of teachers regarding ambiguous results improve rigor and fulfill Common Core and Next Generation Standards and Bioinformatics resources to diversify technology and texts and fulfill Common Core and Next Generation Standards
- Staff presented and judged local and county-wide STEM fairs
- Student participant in the Howard County Space Flight Experiment Program (SSEP) with an expected launch of the experiment to the International Space Station during the summer of 2015.
- Biotechnology curriculum was aligned with Common Core and Next Generation Science Standards.
- Medical Diagnostics and Biotechnology Camp curriculum was developed and will be run for



Construction Management Academy

Instructor: Robert Leiby

Construction Program Highlights

Production Management Project – Seniors planned and supervised the assembly of 12 stand up style student desks. A O F students participated at assembly stations in this collaborative project.

Electrical Station – Designed and built a residential electrical learning station including a sub-panel and various outlets, switches, and fixtures.



Siding Management Project – Students designed, estimated, scheduled, met with supplier, and ordered material for the renovation of the Construction Academy storage building. Students installed soffit, fascia, and vinyl siding.

Band Saw Project - Students made band saw boxes as part of the stationary equipment training.

Sawhorse Management Project – Students constructed 17 saw horses within one hour at the conclusion of a six day project applying construction management standards.

Common Core Math - Students practiced common core mathematics in context by laying out square and octagon building shapes. Students then constructed an octagonal frame.

Cabinet Making - Students produced individual wall cabinet face frames with styles and rails using the new KREG cabinet making equipment

House Project Management - Students designed, scheduled, supervised and framed a full scale building complete with wrap-a-round deck and “L” shape stairs.

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Console Cabinet - Students completed the second stage of the “S” shape contemporary console cabinet for the front lobby.

Hip Roof Project – Students applied common core mathematics and constructed a combination hip and gable roof.

Roof Shingle Project – Students applied three tab shingles and related material to complete the roof finishing curriculum.

CPR Certification - Students Collaborated with the Nursing program to become CPR certified.

Classroom Renovation - Students reviewed plans and supplied input for the future classroom renovation project.



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Cybersecurity Networking Academy

Instructors:

Vipul Savalia/Evan Flesher
Brian Taylor

Teacher Accomplishments

Brian Taylor completed his second year teaching Computer Networking and completed the Cisco Instructor training for the Cisco Certified Network Associate program (CCNA) at the end of June 2015.

In coordination with the School Counselor, Student Support, and IT staff, the ARL became a Pearson VUE Authorized Test Center. This spring, students were able to register and sit for the CompTIA A+, CompTIA Security+, Cisco ICND1/2, and Cisco CCNA exams. This test center is available exclusively for our Cybersecurity Networking students at the ARL and will offer increased test data availability to faculty and staff, as well as decrease the logistical requirements for testing students.

Class Highlights



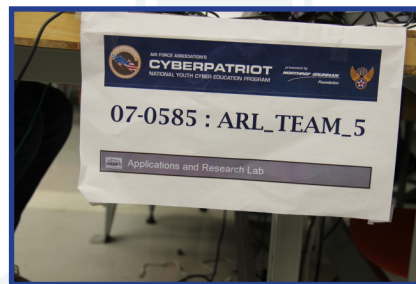
Senior students, instructors, and coordinators were asked to speak on a panel at a conference held by the National Initiative for Cybersecurity Education (NICE) in Columbia, MD. The panel discussed best practices for teaching cybersecurity.

Seniors participated in the Air Force Association's CyberPatriot VII competition in Fall 2014. They progressed through 3 rounds of day-long challenges and were able to advance to the Platinum Tier State Round. Two of our five teams placed 8th and 9th out of over 40 teams in Maryland.

Juniors are expected to compete in CyberPatriot VIII

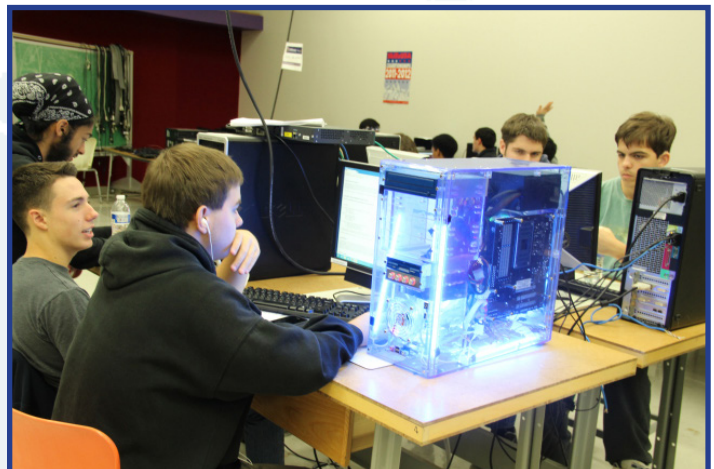


this fall and were invited to tour the Northrop Grumman facility in Annapolis Junction, MD. Students were introduced to internship opportunities offered exclusively to CyberPatriot participants and were given a tour of notable projects and operations hosted by the corporation.



Due to their success in CyberPatriot, seniors were invited to design and participate in a panel held at the Cybersecurity Fair and Expo during the Mid-Atlantic Regional Collegiate Cyber Defense Competition (MACCDC) finals at

Johns Hopkins Applied Physics Laboratory (APL). Students presented their strategies and best practices when preparing for cybersecurity competitions such as CyberPatriot.



Early College Program in Network Security

Instructor:
LaRee Siddiqui



The Early College Access Program in Network Security, a collaboration between Howard County Public Schools and Howard Community College had a very successful inaugural 2014-2015 school year. Twenty eight students from eleven high schools signed up to participate in the program, and all twenty eight have reported they plan on returning next year. This first year focused on developing the students soft skills via a hybrid Career Research and Development I & II curriculum to prepare them for succeeding in a rigorous college environment next year.

As a part of the Early College Program, students were given their own laptop to use for the duration of the school year. 100% of students reported that they enjoyed having their own laptop to use. Student Jordan Evans stated "I like having a laptop because it provided me with Internet access at home that would not have been possible without it." In addition,



students were able to engage in a variety of networking opportunities where they interacted with professionals in the field of Network Security. Student Julian Jones stated, "(in these networking activities) I learned it is crucial to have

mentors and it's important to get your name out there for potential internships and job opportunities". Additionally, in class, the students ran their own business, JA Juice, where they sold portable charging banks to raise money for a scholarship for the Early College Program that will be awarded in 2017-2018 when this first student cohort attends HCC full-time. Student Jaylan Garrick reported that this hands-on experience "taught me how to work in a group with other people to

2015 HIGHLIGHTS

accomplish a task. It also helped me learn what the real world is going to be like so I can prepare for the future."

After completing the first year of the Early College program, students were polled to determine their plans for the future. 96% of students (27 out of 28) reported that they intend on completing their Associates Degree in Network Security from HCC. Additionally, 22 students (78%) indicated that they intended on obtaining a Bachelor's Degree or higher in Network Security or a related field and 6 students (22%) indicated that they plan on obtaining a bachelors degree or higher in a field unrelated to Network Security. Five students (17%) reported that they were not planning on attending any college prior to enrolling in the field of Network Security. 50% of students (14) reported that the Early College Program changed their perspective on college. Student Briahna Richardson stated "I never had a strong desire to go to college after graduating from high school. After my first year in the Early College Program, I want to go to college and I know exactly what I want to do (for my career)."



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Homeland Security and Emergency Management Academy

Instructor: William R. Pratesi

Another exciting year has come to an end as we complete our third full year of the Homeland Security Program. As part of the Maryland Homeland Security Alliance, Howard County is now one of many districts to offer this dynamic program. The course consists of four classes: Foundation of Homeland Security and Emergency Preparedness, Geographic and Information System and Remote Sensing, Advanced Geographic Information Systems, and a Geospatial Applications Worksite experience. Both the foundations class and the GIS (Geographic Information Systems) are offered the student's junior year. The Advanced GIS course and workplace experience are offered the senior year. Students completing the Advanced GIS course will earn a certification in Spatial Technologies and Remote Sensing (STARS).



Our Academy was introduced to many professionals in the field of homeland security, emergency management, and geographic information systems. In the month of September, we visited Howard County's OEM as they activated the Emergency Operation Center for a mock drill, "Let's Get Ready to Rumble." Students in both the junior and senior class were paired with industry leaders charged with making critical decision in case of emergency. For the second straight year, Special Agent Robert Hallman from the FBI visited the junior class in order to set the ground

work for Active Shooter Training in February. In the classroom, students learned about the roles of different government agencies and took a closer look at chemical, biological, nuclear, and radiological weapons. Our seniors embarked on capstone projects in order to complete one half of their required work for the STARS Certification.



As mentioned, Special Agent Hallman conducted a two day seminar on Active Shooter response. The class learned to "run, hide, or fight" in case of an intruder. Once again, our class had an opportunity to take a field trip to Quantico, Virginia's FBI Training Center. Under the guidance of Special Agent Hallman, our class had "behind the scenes" access to the Hostage Rescue Team Training Center. At the Center, a Special Agent from HRT walked us through the compound to observe "live" training. Students witnessed live fire training, visited with an HRT K-9, and were able to see and touch hostage rescue team equipment. We ended our tour by having a sneak peak at the small, yet powerful, serial criminal museum in the FBI Training Facility in Quantico.

Next, our students embarked on a local project for Howard County Public Schools Systems Planning Department. The students did an exhaustive survey of the ARL in order to establish and map safety features inside and outside of our building and other building on our campus. Students were proud to use their GIS knowledge with the purpose of bettering the school systems data inventory. The last assignment for our second graduating class centered on a Capstone Project and STARS examination. Students submitted their projects and, having taking the STARS exam, await the outcome of their efforts. Most importantly, our students had an opportunity to meet and mingle with many homeland security professionals. For example, we were able to strengthen our relationship with the FBI Baltimore Field Office, Howard County Public School Systems Planning Department, Howard County GIS Department, the Howard County Police Department and lastly Howard County's Department of Emergency Management.

"Our duties are wide-ranging, but our goal is clear: a safer, more secure America, which is resilient against terrorism and other potential threats."

Department of Homeland Security
<http://www.dhs.gov>

Hotel and Restaurant Management Academy

Instructor: Rhonda Lang

The Hotel and Restaurant Management Academy exposes students interested in exploring a career in the hospitality industry to many of the career opportunities found under the hospitality umbrella, which include foodservice, accommodations, travel and recreation. The curriculum meshes two nationally recognized curriculums together, one created by the National Restaurant Association called "ProStart" and one created by the American Hotel and Lodging Association called "Hospitality and Tourism Management Program". Both curriculums are written for students at the high school level and incorporate not only an academic component focused on management, but many hands-on components where students are either working in a commercial kitchen setting, a dining room setting or practicing skills like housekeeping in the programs fully functioning hotel room. Another major component of the program, which is new this year, is an online training program created by Micros called "Opera", which is a reservation system used by many hotel chains today, which trains their employees on the use of the reservation system. The students of the HRMA academy are receiving the same training and certification opportunities as the hotel employees in these hotels, which of course gives them a clear advantage when they start looking for jobs after graduation.

Field Trips

- Turf Valley Resort on February 11, 2015 to expose students to all aspects of working in a resort setting.
- Elkridge Furnace Inn on April 30, 2015 to expose students to a fine dining establishment setting and the use of "Farm to Table" dining, which is a big trend in the foodservice industry today.



Special Activities

Guest speakers from Culinary Institute of Virginia, The Culinary Institute of America, The Arts Institute, Howard Community College, The Restaurant School at Walnut Hill

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and Johnson and Wales University came throughout the year and spoke to the students from both levels of the program about their hospitality programs, as well as doing culinary demonstrations for them.

A panel of four guest speakers from the event planning industry and the tourism and convention board industry came to enlighten the students of the HRMA 1 class about their respective fields on March 26, 2015. The students were very engaged and interested in what all the panel members had to say!

The Advanced HRMA students were involved in a yearlong capstone project where they worked in teams to either create a restaurant or a hotel concept. Throughout the project they had to do all the tasks that are involved in actually starting a restaurant or hotel business, from looking at who will be their target markets, to incorporating sustainable practices, to creating a menu and also looking at all the finances involved. It also involved working with the Architectural Design Academy students to come up with a floor plan of their establishment or property and working with the Graphic Design Academy students to create a logo for their establishment or property, as well as helping design menus for their concepts. The culmination of the project occurred in May when the students went to HCC to present their concepts to the hospitality faculty of the college as if they were going to ask a group of investors to invest in their business. Both groups that presented did a terrific job and the faculty was quite impressed with their concepts and presentation.

Students of both levels of the academy, along with the Health Professions students, were involved in two Intergenerational Events. One in the fall and one in the spring. During these events students of both academies were involved in spending time with the local senior population. The Health Professions students did a craft with our guests and then the HRMA students prepared and served lunch to them. It is a very rewarding experience for both the senior population and the students.



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At the end of February, the Advanced HRMA students, planned, prepared and served the students of the Finance Academy a special luncheon during their etiquette presentation. It was a great experience for all students involved.

At the end of April, the students of both levels of the academy were involved in the Mentor Thank You Reception, which was an event that involved all of the academies at the ARL. The students of the HRMA program planned, prepared and served a variety of delicious foods during the reception, as well showing off their hands-on skills at four stations out in front of the guests, which consisted of a crepe station, a fajita station, a flambé station and a pasta station. This was the highlight of the event and all of the guests were impressed with the level of professionalism and skills displayed by all of the students who were involved.

Competitions

In February 3 students from HRMA 2, Sarika Mehta, Ian Sisk and Kim Sindall, competed in the Skills USA Culinary and Baking & Pastry regionals held at Soller's Point HS near Baltimore. Sarika placed 1st during that competition, which allowed her to be eligible to go to the state competition.

In April one student from HRMA 1, Jennifer Nguyen and two students from HRMA 2, Sarika Mehta and Melissa Lopez competed in the Skills USA State Culinary and Restaurant Service competitions and during that competition Melissa placed 1st in Restaurant Service, which

allows her to compete at the National competition being held at the end of June in Louisville, KY. This is the second year in a row that Melissa has had the opportunity to compete at nationals!

Certifications

Eight HRMA 1 students earned their ServSafe Certification in January

Three students in Advanced HRMA, Sarika Mehta, Ian Sisk and Kim Sindall, ended their senior year by earning their ProStart certification, as well as two students, Melissa Lopez and Jeanina London ended

their senior year by earning an HTMP (Hospitality & Tourism Management Professional) certification.

Four of the Advanced HRMA students earned 3 college credits through the new dual enrollment/transcripted credit agreement with Howard Community College. Each student will leave the HRMA program, having earned their first transcripted college grade for the HCC course "Intro to Hospitality" by successfully completing the HRMA program.

Internships

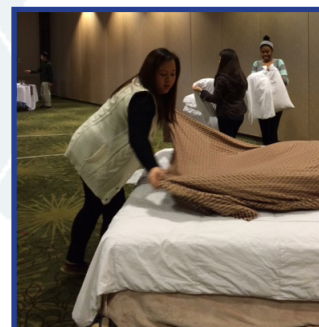
Five students from the HRMA 2 class were involved in internships this year in order to fulfill their requirements for the ProStart and HTMP certifications. The following students were involved in an internship at the following sites:

- Sarika Mehta – Grille 620
- Ian Sisk – Tersiguel's
- Kim Sindall – The Elkridge Furnace Inn
- Melissa Lopez – Turf Valley
- Jeanina London – Hilton Garden Inn

All of the students had enriching and rewarding educational experiences and we are fortunate to have such great local industry mentors to partner with for these experiences.

Senior Future Plans

Three of the HRMA 2 students will be attending the Culinary Institute of America in Hyde Park, NY in the fall, one will be attending Alabama State University's Hospitality School and one will be attending Central Florida University's Hospitality School. The other HRMA 2 students will be either attending HCC or going out into the world of work.



Systems and Project Engineering Academy

Instructor: John Ensor

The Systems Management Solutions class, part of the Systems and Project Engineering Academy, successfully designed both an All Terrain Wheel Chair and an



Electrathon Racecar during the 2014-15 school year. Both teams encountered setbacks throughout the design process, but despite these setbacks, each team was able to test and drive their respective vehicle. Students learned the importance of teamwork and communication while collaborating on

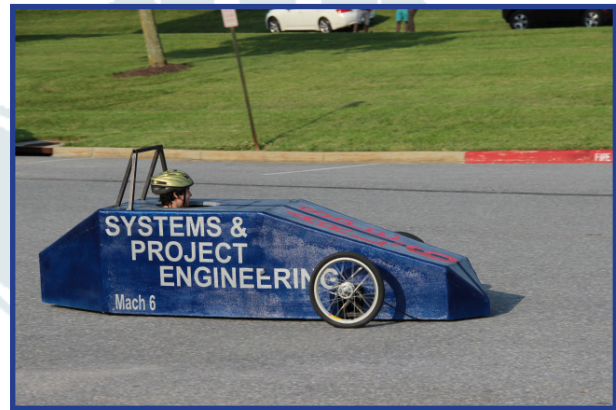
a large engineering project. Topics such as frame design, steering, suspension, and aerodynamics were useful for both teams, and were incorporated into the final designs. Many of the rising seniors in the Systems and Project Engineering Academy intend to continue their engineering studies next fall, as they begin their internships with local engineering firms.

Our senior mentorship program, Systems Engineering Innovation, continues to be a very valuable part of the academy program. We would like to thank our mentors at local engineering firms for their hours spent working with our students:

- Martime Applied Physics
- Allen and Sharif Engineering
- KCI Engineering
- Prime Manufacturing Corporation
- Race Pace Bicycles
- KCI Engineering
- Johns Hopkins Applied Physics Lab
- MTH Trains



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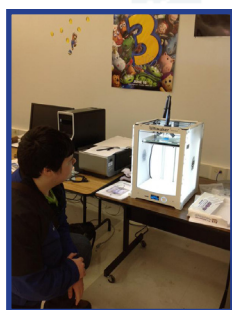
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Visual Communications Academy

Animation Pathway

Instructors:
John Cservek
Tina LeBaron (MLA, NBCT)

The Animation program at the ARL had a successful year of competitions, scholarships, and technological advancements. Students have had the opportunity to incorporate motion capture and 3D printing into their projects. Advanced Animation classes worked with the Architectural Academy to create visualizations for their advisory board members.



Field Trips

UMBC Digital Entertainment Conference– Students were invited by a 2014 alumni of the Animation Program invited interested students to attend the Saturday event. Professionals from four local game companies spoke to the students about both the technical and artistic processes involved in game development.

Special Activities

- Worked with the Architecture Academy to model visualizations based on blueprints from their advisory board.
- Participated in the Howard County Library System's first Comic Con. We demonstrated to attendees how 3D Animation works and allowed them to try themselves

Guest Speakers

- Mike Williams, USGamer, spoke about the state of the industry and answered questions.
- Austin Kline, alumni 2013, spoke about his time at SCAD and how to begin working on animated features during your freshmen and sophomore years.
- Jason Robinson, Lab Zero Games, spoke about his work and his job as a Clean-Up Artist on Skull Girls. He demonstrated his workflow from pencil reference to finished product.

Competitions and Awards

- Skills USA – State Competition
- Hunter Dopkin and Connor Calder – 1st Place, 3D Animation & Visualization
- Bailey Lorsong and Justin Woodard – 2nd Place, 3D Animation & Visualization

Independent Games

Half of Ms. LeBaron's Animation 1 Class formed an after school class to work on their own independent game. They created a demo and plan on having their first level finished by the end of the summer.

The Advanced Animation Classes succeeded in making two playable games, 20 Seconds Go and Cat Studio.

Jay Blasko joined a cohort of other incoming SCAD students to create a fighting game.

Certifications

Over 50% of our students became Autodesk 3DS Max Certified

Senior Scholarships

- Jay Blasko and Aiveen Dunn– SCAD
- Hunter Dopkin - Full Sail.
- Rebecca Stern – MICA
- Jake Powers - Salisbury

Senior Future Plans

Most are going to art school to pursue animation or game design . Jamahjae Hawkins plans on using his visualization skills to pursue engineering.

Instructor Accomplishments

- Welcomed John Cservek as our new Animation Teacher
- Tina LeBaron wrote curriculum to transition Animation Program to Animation and Interactive Media Production. Began incorporating new lessons this year with great success.

We're ending the year by getting ready for the Skills USA Nationals competition. We've also confirmed guest speakers from the film industry.



Graphic Design Pathway

Instructor

Raymond Lee, BFA, MFA, MS

The Graphic Design Academy introduces the students to a variety of Art and Design experiences. The main emphasis is digital design and illustration as applied to various visual communications fields. It encompasses but not limited to publishing, electronic design and illustration. Students are encouraged to explore original creative concepts and their applications to client needs.

Special Activities

- Designed Bright Minds Foundation Golf Promotional materials
- Won Regional SkillsUSA Advertising Design Competition
- Third Place in SkillsUSA State Competition
- Participated in SkillsUSA Pin Design Competition
- Created logo for Culinary Competition
- Created Health Profession Graduation Program
- Created Culinary Competition Menu Logo design
- Created logo for Hotel Competition

Competitions

- Won 1st place SkillsUSA Regional Competition in Advertising Design
- Won 3rd place SkillsUSA MD State Competition in Advertising Design

Awards

- Attended PGAMA Awards Banquet with student winner and parents to receive
- SkillsUSA Regional Competition Award

Certifications

Junior Graphic Design class achieved an 85% certification rate

Scholarships

Kevin Guyer received a 32K Scholarship from MICA.

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