

# Matthew A. Clarke, E.I.T.

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## EDUCATION

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### Stanford University

Ph. D. Candidate, Aerospace Engineering  
Cumulative GPA: **3.58/4.00**

Stanford, CA

*Jun 2021 (Anticipated)*

Master of Science, Aerospace Engineering  
Cumulative GPA: **3.58/4.00**

*Dec 2018*

### Howard University

Bachelor of Science, Mechanical Engineering, *Summa Cum Laude*  
Cumulative GPA: **3.93/4.00**

Washington, D.C.

*May 2016*

### **Technical Skills:**

#### **Engineering Applications**

Computer Aided Design Software - NX/ Unigraphics; Autodesk Inventor, Solid Edge, Solid Works; Nastran; ANSYS Fluent; XFLR5; MATLAB; C++(basic); Microsoft Office

#### **Equipment**

AEROLAB Educational 17" Wind Tunnel; Dimension SST 1200es 3-D Printer; Scanning Electron Microscope (SEM)

### **Certifications: Engineer-In-Training**

*Nov 2016*

Department of Consumer Affairs State of California: Board for Professional Engineers, Land Surveyors and Geologists

### **Siemens GO PLM Certification Exam for NX 8.5**

*Jul 2013*

Siemens PLM Global Opportunities in Product Lifecycle Management (GO PLM)

## RESEARCH & WORK EXPERIENCE

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### **Aircraft Design Engineer, SPIKE Aerospace**

*Sept 2017– Present*

- Assist in the preliminary design, development and optimization of the Spike S-512 Quiet Supersonic Business Jet using a multi-fidelity analysis approach
- Utilize trade and range studies to create a network of mission profiles for international transit to and from some of the busiest air travel hubs

### **Graduate Researcher, Stanford University**

*Mar 2017– Present*

*Aerospace Design Laboratory (ADL), Dept. of Aeronautics and Astronautics*

- Spearheaded the implementation of Athena Vortex Lattice (AVL) into SUAVE, an environment for conceptual vehicle design and optimization developed by ADL. This addition extends SUAVE's static and dynamic stability analysis of aircraft configurations whose geometry pose difficulty in obtaining accurate results. Such planes include oblique-wing, joined-wing, canard and blended-winged-body (BWB) aircraft.
- Performed aerodynamic shape optimization on the Aquila concept aircraft, a HALE solar powered drone developed by Facebook to provide internet connectivity to unserved and underserved populations of the world.

**STEM Curriculum Development Teaching Assistant, Stanford University**

*Jun 2017– Sep 2017*

*Greene Scholars Program*

- Developed an interactive curriculum complete with common core standards and creative content delivery for GSP, a K-12 STEM enrichment program for African-American youth in Silicon Valley.
- Created lesson plans and instructor manuals for a wide range of topics including Engineering Mechanics, Electronics, Biology, Chemistry, Neuroscience and Entrepreneurship.

**Design Consultant, Center for Energy Systems and Control (CESaC), Howard University**

*Feb 2016–Apr 2016*

*Federal Aviation Administration (FAA), Dept. of Electrical Engineering, Howard University*

- Assisted in drafting a technical data package for an Advanced Transient Lightning Protection scheme for the FAA approach lighting system, which guides the approach-landing path of the aircraft.
- Produced mechanical, assembly and electrical wiring drawings for the device with a detailed theory of operation and construction data.

**Summer Research Intern, Massachusetts Institute of Technology**

*Jun 2015–Aug 2015*

*Device Research Laboratory, Dept. of Mechanical Engineering*

- Developed a mathematical model using MATLAB to characterize water droplet evaporative cooling for localized air conditioning, specifically via jumping droplet condensation on superhydrophobic surfaces.
- Predicted the size of droplets required to effectively cool the head and upper torso of an adult human being. This method of cooling has been proven to be more sustainable than existing devices that rely on moving mechanical parts and a coolant reservoir.

**Undergraduate Research Assistant, Howard University**

*Sep 2014–May 2016*

*Aero Fluids Lab, Dept. of Mechanical Engineering*

- Designed, fabricated and compared the performance a novel hybrid aircraft concept to the Blended-Winged-Body Baseline configuration and the conventional Tubular-and-Winged aircraft configuration through Computational Fluid Dynamics and wind tunnel testing.
- Conducted validation experiments on a newly proposed economical approach to fabricating subsonic airfoils.

**Undergraduate Research Assistant, Howard University**

*Jun 2014–Sep 2014*

*Applied Mechanics and Materials Research Lab, Dept. of Mechanical Engineering*

- Supervised undergraduate research efforts aimed towards mapping surface deformation and failure of 3D printed polymers using digital image correlation.
- Facilitated the testing of 3D printed polymers at varying strain rates to determine the energy damping and impact resistance characteristics for civil and military applications.

**Teaching Assistant, Howard University**

*Sep 2013–May 2016*

*Dept. of Mechanical Engineering*

- Partnered with lead professor of the MEEG 103 (Introduction to Computer Aided Design) and MEEG 421 (Product Data Management) courses to lead classroom instruction, provide feedback on student work deliverables, and develop supplementary learning resources.
- Lead group and individual tutoring sessions.

**Laboratory Technician, Howard University**

*Sep 2013–May 2016*

*Computer Integrated Manufacturing and Robotics Laboratory, Dept. of Mechanical Engineering*

- Designed components of an Electric Vehicle Battery Swapping Station for a General Motors capstone team.
- Developed and performed Finite Element Analysis on components of a Bubble Injection System used to characterize the activity of a bubble under pressurization and excitation for a Sandia National Laboratories sponsored capstone team.

## **NOTABLE ENGINEERING PROJECTS**

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### **Sources of Material Failure Variability; Mechanical Engineering Project with Sandia National Lab**

*Sep 2015–May 2016*

#### *Team Leader*

- Examined the variability of material failure and determining the variability due to microstructure, geometric tolerances, and eccentric loading of Al 6061-T6 samples
- Designed and constructed a tensile tester that produces swift and precise measurements

### **The Application of Electromyography to Control 3D Printed Prosthetics; Electrical Engineering Project with Intel**

*Sep 2015–May 2016*

#### *Co-Team Leader*

- Design and fabricated an inexpensive, non-invasive 3D printed prosthetic arm controlled by electrical pulses from the brain
- Captured neurological signals and translated them into hand motion utilizing electromyography technology and an Intel microcontroller board

### **Partners for the Advancement of Collaborative Engineering Education (PACE)**

*May 2013–Aug 2014*

#### *Team Leader*

- Managed a collaborative team of mechanical engineering and fine-arts students in the design of a hybrid bus concept featuring a fully sustainable electric bike storage system to increase the urban bike sharing capacity
- Awarded second place in the 2014 Global Collaborative and Innovation Challenge in Turin, Italy; Awarded first place in the 2013 Global Collaborative and Innovation Challenge in California, U.S.A.

## **EXTRA-CURRICULAR LEADERSHIP**

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### **Bay Area Graduate Pathways to STEM (GPS)**

*Jul 2017 – Sep 2017*

#### *Student Recruitment Subcommittee Member*

- Bay Area GPS is a one-day conference where students attend informative workshops addressing the benefits of pursuing an advanced degree, both MS and PhD, while also preparing for graduate school and the application process.

### **Engineers Without Borders**

*Sep 2012–July 2016*

#### *Student Chapter President*

- Installed bio-sand filters in homes and institutions across rural communities in Kenya to purify contaminated water; reduced community death rate from 52 to 0 in a year; distributed sanitary storage containers to capture filtered water and training tutorials for local engineers.
- Initiated humanitarian projects in El Salvador and Haiti geared towards implementing infrastructure for communal trade and sewage. Other projects included designing & constructing water purification and storage systems that will reduce fluoride levels and deliver a safe source of water

### **American Society of Mechanical Engineers**

*Aug 2012–Present*

#### *Graduate Member*

#### *Programs Coordinator, Howard University Chapter*

- Promoted student involvement in the organization and the organization's involvement in the campus and community life. This included the recruitment, development, student retention and improvement of faculty and student relations to achieve a productive research and creative learning environment
- Assisted in writing, editing, and distributing corporate sponsor packages

**Howard University Chrysler LLC Team Adoption Program**

*Aug 2013–May 2014*

- Provided an in-depth study on the improvement of the performance and ergonomic utility of the U-Connect RB5/CTP navigation and infotainment system with 8.4” touchscreen radio in the Chrysler 300 Series

**Howard University General Motors Team Adoption Program**

*Nov 2012–May 2013*

- Served as a mentor to the Howard University Middle School NREL Junior Solar Sprint Competition.
- Built and modified a Radio-Control car for conceptual engineering analysis

**PROFESSIONAL AFFILIATIONS**

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**Stanford University Black Engineering Graduate Students Association**

*Sep 2016 – Present*

**Stanford University Black Graduate Students Association**

*Sep 2016 – Present*

**Tau Beta Pi Engineering Honor Society**

*Inducted, Apr 2014*

*Vice President of DC Alpha Chapter (Aug 2015–May 2016)*

**American Institute of Aeronautics and Astronautics**

*Jun 2016–Present*

*External Outreach Chair, Stanford University Student Chapter*

**National Society of Black Engineers**

*Sep 2012–Present*

**HONORS AND AWARDS**

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- Stanford University Graduate Engineering Fellowship *Apr 2016*
- Tau Beta Pi Engineering Honor Society Fellowship; *One of 19 nationally Apr 2016*
- Tau Beta Pi Engineering Honor Society Scholarship; *One of 261 nationally Jun 2015*
- American Society of Mechanical Engineers Foundation Scholarship *May 2015*
- Winner of the Global Siemens PLM Software Student Monthly Computer Aided Design Contest *Oct 2013*

**PUBLICATIONS AND PRESENTATIONS**

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**AIAA Aviation and Aeronautics Forum and Exposition – Denver, Colorado**

*June 2017*

- MacDonald, T., **Clarke, M.**, Botero, E., Vegh, J. M., Alonso, J. J., "SUAVE: An Open-Source Environment for Multi-Fidelity Vehicle Optimization," AIAA Aviation, Denver, CO, June 2017. [AIAA 2017-4437](#)

**ASME International Mechanical Engineering Congress & Exposition – Houston, Texas**

*Nov 2015*

- **Clarke, M.**, Norman N., Smith S., “*Hybrid-MCX-1, BWB and 777 Aircraft Comparison*”, Proceedings of the ASME International Mechanical Engineering Congress & Exposition, Houston, TX, November Nov. 2015, Vol.1: Advances in Aerospace Technology, [Paper No. IMECE2015-52526](#)
- *Undergraduate Research Expo Presentation: Clarke, M.*, Norman N., Smith S. “*Construction and Analysis of Subsonic Airfoils for Wind Tunnel Testing*”

**Howard University Research Symposium – Washington D.C.**

*Apr 2015*

- Presented the findings of my paper entitled “*Construction and Analyses of Subsonic Airfoils for Wind Tunnel Testing*”
- Awarded Most Outstanding Undergraduate Presentation in Physical Sciences & Engineering

**Howard University Research Symposium – Washington D.C.**

*Apr 2015*

- Co-authored the poster presentation “*CT-Guided 3D Printable Models for Anatomy Teaching*”. This research initiative focused on the process of transforming DICOM images (i.e. CT images) into a format suitable for 3D printing for the purposes of education and training in medical gross anatomy courses.

**6th International Conference on Appropriate Technology – Nairobi, Kenya**

*Nov 2014*

- Co-authored the paper “*Sustainable Water Treatment: The Biosand Filtration System*”. This paper highlighted the use of an adapted slow sand filtration technique to reduce turbidity and remove harmful microbial contaminants
- Co-authored the paper “*Sustainable Water Treatment: Addressing Water Quality Issues in Agua Caliente, El Salvador*”. This paper highlighted the removal of fluoride from drinking water using activated alumina and bone-char.

**REFERENCES AVAILABLE UPON REQUEST**