Sarah Charlotte Simmons

2026 Resume

Contact

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Computer Skills

Microsoft: Word, Excel, Powerpoint, Outlook, Sharepoint

Google Workspace: Docs, Slides, Sheets, Mail, Drive, Classroom

Adobe: Acrobat Pro, Reader, Express

Electronics-Engineering Skills

C++ Programing Language, Animations, Lucidcharts, Schematic Designing, Electronic Circuitry Design, Prototyping Process & Development, Design and Conduct of Human Trials

Biology-Chemistry Laboratory Skills

Titration, Spectroscopy, ECG, Spirometry, Animal Blood Collection, Dissection

Design Software

Canva, Adobe Rush, Procreate, Procreate Dreams

Languages

English - Fluent
Spanish - Conversational

Summary

Academics

June 2027 Graduate Date

High School Cumulative GPA: 4.0 / 4.0 (unweighted)

ACT (2026): 33 Superscore (98% national ranking)

SAT (2026): 1310 Composite

Research

2026 U.S. Provisional Patent #: 64/128,598. Filed August 2026.

Wearable Respiratory Monitoring System Integrating Conductive Fabric.

Developed a sensor belt that utilizes electrically conductive fabric to measure chest expansion as a novel means of measuring and remotely transmitting respiration and forced vital capacity data.

2026 Pennsylvania Academy of Science Conference Presentation (April 2026).

"*The integration of electrically conductive textile technology and unique algorithms in the acquisition and analysis of critical pulmonary data.*" (Wilkes-Barre, PA)

Recent Honors & Recognitions

See below for additional awards

2026 U.S. Congressional Award, Silver Medal

Awarded for Public Service and Personal Achievement

2025. Appointed to the Carroll Valley Borough Council, Jr. Member

2025 National Society for High School Scholars Honors Society, Ambassador

Awarded for Academic Merit and Educational Achievement

2025 First Place & Grand Champion, Pennsylvania Governor's STEM Competition

Awarded for Biomedical Engineering Research and Prototype Development

2025 First Place, "Engineering, Applied Science, and Technology" Capitol Area Science Fair, ISEF Regional Affiliate

Awarded for Project Integrating Technologies to Develop a Prototype to Measure and Remotely Transmit Key Human Vital Signs

Work / Internship Experience

2026 Catoctin Veterinary Clinic, Veterinarian Assistant

2025 Catoctin Veterinary Clinic, Internship

Research

Simmons, E.A. and S.C. Simmons. (April 2026). The Integration of electrically conductive textile technology and unique algorithms in the acquisition and analysis of critical pulmonary data. Oral Presentation.

- Pennsylvania Academy of Science. (Wilkes-Barre, PA)
- Abstract: The project researched and tested the viability of using electrically conductive textiles as a novel method for detecting thoracic cavity expansion for the purpose of measuring key physiological functions.

Simmons, E.A. and S.C. Simmons. (May 2025). "Integrating e-Textiles, Nano-Technology, and Artificial Intelligence to Enhance Physiological Data Acquisition". Research, Poster, and Presentation

- Capital Area Science and Engineering Fair-ISEF affiliate (Harrisburg, PA)
- Abstract: Equitable access to healthcare has been a long-standing problem in the US and globally. While the US is a leader in healthcare, a significant number of Americans face access barriers to healthcare. This project examines how the integration of cutting-edge technologies can be used to develop high fidelity prototype that utilizes Universal Design Principles to help broaden access to healthcare.

Simmons, E.A. (April 2025). *"Smart Fabric Biosensing System for Monitoring Respiration Patterns in Horses with Respiratory Diseases"*

- National Junior Science and Humanities Symposium (Chantilly, Virginia)
- Abstract: This project developed a working prototype to collect and analyze equine respiration data that can be remotely transmitted to owners/trainers to monitor the health of horses with respiratory diseases. The prototype integrated carbon embedded conductive textiles and electronics engineering to develop a biosensor that measures inhalation and exhalation movements and calculates respiration activity.

Simmons, E.A. and S.C. Simmons. (April 2025). "Developing Novel Methods of Physiology Data Collection and high fidelity prototyping to Address Barriers to Healthcare Access". Research Paper, Poster, and Oral Presentation.

- 2025 Pennsylvania Governor's Science, Technology, Engineering, and Mathematics Competition (State College, PA)
- Abstract: Integration of advancements in materials sciences, nanotechnology, artificial intelligence, electronics engineering, and computer networking to develop and build a wearable biofunction sensor-based prototype that is comparably accurate to commercial instrumentation that can transmit real-time and longitudinal physiological data to medical providers.

Simmons, E.A. and S.C. Simmons. (June 2024). "Integrating Smart Textiles and Internet of Medical Things (IoMT) to Expand Remote Healthcare for Chronic Respiratory Patients. Research Paper, Poster, and Oral Presentation.

- The Henry Ford Foundation's Invention Convention (Dearborn, MI)
- Abstract: Development process of biosensing medical device that incorporates Internet of Medical Things (IoMT) connectivity to expand access to healthcare for those with Chronic Lower Respiratory Diseases (CLRD). The prototype uses conductive textiles and custom algorithms to collect, analyze, and remotely transmit real-time and longitudinal respiratory data from patients to medical providers.

Simmons, E.A. and S.C. Simmons. (June 2024). *"Bridging the gap between doctors and patients with respiratory diseases". Poster and Oral Presentation*

- U.S. Army & National Science Teaching Association (Washington, DC)
- Abstract: Design and build a working prototype that accurately acquires and measures key lung function using a novel integration of conductive fabric and algorithms. The project also developed mobile application software that enables the prototype data to be remotely transmitted in real-time to healthcare providers.

Simmons, E.A. and S.C. Simmons. (March 2023). *"Smart Fabric Biosensing System for Monitoring Respiration Patterns in Horses with Chronic Respiratory Diseases"* Research Paper & Poster

- Frederick County, MD STEM Competition (Frederick, MD)
- Utilizing advances in materials engineering and customized coding and algorithms, this project developed a prototype that captures and analyze pulmonary functions in horses with asthma. The prototype is constructed using smart fabric technology, a small form microcontroller, and novel coding. The acquired data is streamed or stored for diagnosing and developing treatments for horses with respiratory diseases.

Simmons, E.A. and S.C. Simmons. (June 2023). "Portable Bronchodilator Delivery System for Equine Respiratory Diseases" Research Paper, Poster, and Oral Presentation.

- Society for Science, Broadcom Masters Nationals (Washington, DC)
- Abstract: Research and design of a working biomedical prototype that accurately and efficiently delivers equine bronchodilation medication through portable administration.

STEM Competition Awards

2025 Capitol Area Science Fair, ISEF Affiliate

"Integrating E-Textiles, Nanotechnology, and AI to Enhance Physiological Data Acquisition"

- 1st Place, Senior Engineering, Applied Science, and Technology
- 1st Place, American Engineers Association-Harrisburg Award
- Finalist Grand Champion Award

2025 Junior Science and Humanities Symposium

"The Integration of Smart Textiles and Cutting Edge Technologies to Acquire Biofunction Data for Telemedicine"

- Finalist, Regional Competition

2025 Pennsylvania Governor's STEM Competition

"Integrating E-Textiles, Nanotechnology, and AI to Enhance Physiological Data Acquisition"

- Grand Champion Award
- Top 20 Pennsylvania STEM Projects

2024 US Army's eCybermission (VA)

"Bridging the gap between doctors and patients with respiratory diseases"

- 1st Place, National Competition
- 1st Place, Regional Competition (North-East)
- 1st Place, State of Competition (Pennsylvania)

2024 PA Governor's STEM Competition

"The Integration of Electrically Conductive Textile Technology and Unique Algorithms in the Acquisition and Analysis of Critical Pulmonary Data in Pennsylvania Patients with Respiratory Diseases"

- Grand Champion Award
- Top 20 Pennsylvania STEM Projects

2024 York-Adams County Science & Engineering Fair (ISEF affiliate)

"*The Application of Conductive Textile Technology and Novel Algorithms for a Clinical IoMT System in the Remote Acquisition and Analysis of Critical Pulmonary Data in Patients with Respiratory Diseases*"

- Invitation to Society for Science International Science & Engineering Fair
- Grand Champion Award
- Lemelson Award for Inventions

2024 Invention Convention (Henry Ford Foundation, MI)

"Integrating Smart Textiles and IoMT to Expand Remote Healthcare for Chronic Respiratory Patients"

- National Finalist
- 1st Place, Regional Competition (North-East)
- 1st Place, State Competition (Pennsylvania)

STEM Competition Awards

2023 Frederick County STEM Competition (Frederick, MD)

"Smart Fabric Biosensing System for Monitoring Respiration Patterns in Horses with Respiratory Diseases"

- 1st Place, Biomedical Engineering
- Washington DC Metropolitan Branch Commissioned Officers Association of the US Public Health Service
- Meritorious Achievement Award, Dr. R Ediger Award
- Excellence in Agricultural Research Battelle National Biodefense Institute
- Outstanding Achievement Award JLG Industries

2023 Mother Seton School (Emmitsburg, MD)

"Smart Fabric Biosensing System for Monitoring Respiration Patterns in Horses with Respiratory Diseases"

- Outstanding Engineering Award Mother Seton School STEM Fair
- Grand Champion Invention Award Certificate of Excellence in STEM
- 1st Place Engineering Invention Award

2022 Society for Science, Broadcom Masters National STEM Competition (Washington, DC)

"Portable Bronchodilator for Equine Respiratory Disease"

- Broadcom Masters Rising Star Award
- Broadcom Top 30 Award, National Finalist
- Broadcom Top 300 Award, National Semi-Finalist

2022 Frederick County Science & Engineering Fair (Frederick, MD)

"A Novel Approach to Resolving Equine Respiratory Distress"

- Grand Prize Winner Middle School Division 1st Place, Biomedical Engineering
- Lemelson Foundation Early Inventor Prize
- Hively Family Foundation Innovator Award for Outstanding Achievement

2022 Mother Seton School STEM Fair (Emmitsburg, MD)

"A Novel Approach to Resolving Equine Respiratory Distress"

- 1st Place: Engineering Invention Award
- Grand Champion Award

RECENT MEDIA COVERAGE

Pennsylvania Cable Network. *Borough Government roundtable: Inside PA Boroughs*. Pennsylvania State Association of Boroughs. (August 2026).

Emmitsburg News Journal, "Borough proposed teen summer reading program." (28 June 2026)

Gettysburg Times Newspaper, "Students' Medical Device Wins National Award" (10 August 2024)

National Science Teachers Association, "National Winners Named in the 22nd Annual eCYBERMISSION STEM Competition" (July 2024)

Catoctin Banner Newspaper, "Simmons Sisters Win US Army's 22nd Annual eCYBERMISSION STEM Competition" (31 July 2024)

WHTM ABC27 TV (Harrisburg), "Telemedicine Twin Inventors" (31 July 2024)

WPMT FOX 43 TV (Harrisburg), "Dynamic Duo" (12 May 2024)

Gettysburg Connection Newspaper, "Local Twins Win Top Honor at the PA Governor's STEM Competition" (09 May 2024)

Society for Science, "Middle schoolers spent their summer vacations learning how STEM is shaping the world" (October 2023)

Society for Science, Science News Explores, "How to turn your hobby into a seriously cool science project" (November 2022)

Other Awards and Recognitions

ACADEMIC AWARDS and RECOGNITIONS

2026 U.S. Congressional Silver Medal
2006 STEM Star Award, Ferring Pharmaceuticals and U.S. Congressional Award
2026 U.S. Congressional Bronze Medal
2025 U.S. Congressional Gold, Silver, and Bronze Certificates
2025 National Society of High School Scholars
2025 National Society of High School Scholars Ambassador
2025 College Board Outstanding Academic Achievement
2023 National Junior Honors Society, Archbishop James Bayley Chapter at Mother Seton School
2023 U.S. Presidential Excellence Award
2023 Mother Seton School Outstanding Academic Excellence Award
2023 Mother Seton School Outstanding Achievement in Science
2023 Mother Seton School Outstanding Achievement in Math
2023 Mother Seton School Outstanding Achievement in Language Arts
2023 Mother Seton School Outstanding Achievement in Social Studies
2023 Mother Seton School Outstanding Achievement in Art
2023 Mother Seton School Outstanding Achievement in Spanish

HUMANITIES and FINE ARTS COMPETITION AWARDS

2023 American Library of Poetry National Poetry Contest Finalist, “Expression”
2021 Veterans of Foreign Wars, Certificate of Merit, Patriots Pen Certificate of Merit
2021 Hanover Area Arts Guild Juried Art Competition Award of Excellence

CERTIFICATIONS

2024 Jr. Arduino Programming Certification
2024 Red Cross Water Safety Certification

Professional and Service Commitments

PROFESSIONAL ASSOCIATIONS

National Society for Professional Engineers
Pennsylvania Society for Professional Engineers
Pennsylvania Academy of Science
American Physics Society
Society of Women Engineers
Women in Science

FINE ARTS ASSOCIATIONS

Emmitsburg Community Chorus
St. John Lutheran Choir
St. John Lutheran Handbell Choir

SERVICE COMMITMENTS

Carroll Valley City Council, Junior Member
National Society for High School Scholars, Member and Ambassador
United States National Archives, Citizen Archivist
AARP Wish of a Lifetime - Cupid’s Crew, Volunteer
St. John Lutheran Church, Volunteer
American Heart Association, Volunteer
Trinity UMC Community Meals Program, Volunteer