Benjamin Francis

West Columbia, SC 29169 | (803) 467-6248 | ben.francis551@gmail.com

EDUCATION

University of South Carolina – Columbia
Master of Science (M.S.) in Mechanical Engineering | GPA: 4.0 *Expected December 2024*

University of South Carolina – Columbia
Bachelor of Science (B.S.) in Mechanical Engineering | GPA: 3.573 *Graduated December 2021*

RELEVANT EXPERIENCE

Graduate Research Assistant | University of South Carolina *January 2022 – Present*

- Produce novel methodologies to realize a closed-form optimization cycle for Automated Fiber Placement (AFP)
- Develop physics-based models to predict behavior of AFP process parameters
- Create machine program to manufacture experimental structures using CATIA V5 software

Engineering Intern | NASA Langley Research Center *June 2022 – August 2022*

- Enhanced post processing software to create machine program for manufacturing steered composite laminates
- Implemented functionality to generate a cleaner, more efficient workflow using Python
- Assisted with manufacturing and inspection trials of several projects at the ISAAC (Integrated Structural Assembly of Advanced Composites) facility

Undergraduate Research Assistant | University of South Carolina *August 2021 – December 2021*

- Evaluated existing literature to create review for physics-based process modeling and digital twins in AFP
- Developed software to calculate roller orientation needed to achieve optimal AFP compaction pressure

Engineering Intern | Nephron Pharmaceuticals *May 2021 – August 2021*

- Worked on several key projects to advance pharmaceutical manufacturing with the Design and Robotics team
- Automated the quality assurance process of Blow-Fill-Seal vials through enhancement of machine functionality
- Composed project documentation to evaluate machine capabilities and establish standard operating procedures

WORK EXPERIENCE

Academic Tutor | University of South Carolina *August 2020 – December 2021*

- Guided student athletes through course material by developing proper study skills and strategies
- Highlighted important subject matter and created practice problems for stronger comprehension
- Worked with students from varying academic backgrounds on enhancing their scholarly habits

Martial Arts Instructor | Columbia Martial Arts and Fitness *January 2015 – August 2020*

- Lead students aged 3-16 in the fundamentals of Jeet Kune Do, Brazilian Jiu Jitsu, and Leadership
- Instilled important life lessons through coaching and character development
- Encouraged student's physical growth through exercise, coordinated practice, and scenario training

SKILLS

- CATIA V5 | Creo | Autodesk | Siemens Process Simulate | HyperX | Vericut Composite Programming | MATLAB | Python | Design for Manufacturing | CAD/CAM | Microsoft Office

ACHIEVEMENTS AND AWARDS

- Garnet Scholars Award | Dean's List | Senator John G. Blackmon Mechanical Engineering Scholarship | Dr. Nathan E. Hardwick Mechanical Engineering Scholarship

PUBLICATIONS

Journal Articles

- Brasington, A., **Francis, B.**, Godbold, M., & Harik, R. (2023). A review and framework for modeling methodologies to advance automated fiber placement. *Composites Part C: Open Access*, *10*, 100347. https://doi.org/10.1016/j.jcomc.2023.100347

Conference Proceedings

- Godbold, M., **Francis, B.**, Brasington, A., & Harik, R. (2023). Hybridized Model for Temperature Prediction in Automated Fiber Placement. *SAMPE Conference and Exhibition*. Seattle, WA.
- **Francis, B.**, Kirkpatrick, M., Sander, D., Brasington, A., & Harik, R. (2023). Towards a Virtual Manufacturing Architecture to Capture the Automated Fiber Placement Lifecycle. *SAMPE Conference and Exhibition*. Seattle, WA.

PRESENTATIONS

- **Francis, B.**, (2023). Towards a Virtual Manufacturing Architecture to Capture the Automated Fiber Placement Lifecycle. *SAMPE Conference and Exhibition.* Seattle, WA.
- **Francis, B.**, (2022). Physics-Based Process Parameter Modeling for Automated Fiber Placement. *NASA EPSCoR Workshop*. Columbia, SC.
- **Francis, B.**, (2022). Post-Processing Software for Steered Composite Optimization. *NASA Langley Research Center*. Hampton, VA.
- **Francis, B.**, (2022). Physics/Multiphysics Modeling in Automated Fiber Placement: A Literature Review. *NASA EPSCoR Meeting.* Columbia, SC.