Hannah Gillespie

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EDUCATION

University of Cambridge, Cambridge, United Kingdom   Est. September 2025
MPhil in Engineering for Sustainable Development

Imperial College London, London, United Kingdom   September 2024
*MSc in Computing – Winner of the two-year **2023 Marshall Scholarship** for graduate study in the UK*   **Distinction**

University of Notre Dame, Notre Dame, Indiana, United States   May 2020
BS in Mechanical Engineering, Concentration in the Grand Challenges Scholars Program, Minor in Theology   **GPA: 3.98/4.00**
- Recipient of the Chick Evans Caddy Scholarship, a full tuition and housing scholarship for deserving golf caddies
- Best performance in class for capstone senior design project to develop traction-controlled autonomous vehicle
- **Publication:** Juliano, T., Bustard, A., Gillespie, H., & Hayashi, T. (2023) Investigation of a high-speed duct flow with global surface measurements and background orient schlieren. *AIAA AVIATION Forum*

RESEARCH EXPERIENCE

Imperial College London, London, England   September 2023-September 2024
MSc Researcher
- **Thesis:** Detection of Acute Oak Decline Risk Levels by Unmanned Aerial Vehicle with Real-Time Deep Learning
- Created pipeline to generate and label synthetic data automatically with the 3D modeling software Blender/Python API
- Curated dataset of over 10,000 images composed of real, synthetic, and augmented images of trees with four unique classes defining low-risk oak, medium-risk oak, high-risk oak, and non-oak
- Developed custom YOLO-based object detection model for a drone to inspect oak trees for novel decline disease achieving a mean Average Precision (mAP) of 0.902 across all classes at 50% intersection-over-union (IOU)
- Tested inference in ROS2/Gazebo simulation as well as field testing in woodlands at Attingham Park National Trust

International Scholars Program, Kellogg Institute for International Studies   August 2017-May 2020
Research Investigator
- Assessed homeowner behavior motivations in post-natural disaster reconnaissance situations through a National Science Foundation-funded research project to increase community resilience
- Devised and actuated a 60+ question offline survey in Creole through the Fulcrum app with programmed display logic
- Traveled to Haiti to train community members to implement new survey technology
- Processed results from 1392 surveys collected in Léogâne and Les Cayes, Haiti

Department of Aerospace and Mechanical Engineering, Notre Dame, Indiana, United States   August 2018-May 2020
Research Assistant
- Streamlined cross-correlation software and post-processing code to implement background-oriented schlieren (BOS) technique in new Mach 6.0 wind tunnel in the White Fields Research Laboratory on campus
- Coordinated multiple BOS experiments using high-resolution camera in ACT-1 wind tunnel to validate technique

Imperial College London, London, United Kingdom   June 2017-August 2017
Research Assistant
- Developed a robotic proxy for remote physician palpation in low-income areas around the world as part of the MOTION Project, a three-year £1.2 million research project through the Dyson School of Design Engineering
- Created physical phantom organs, calibrated three different sensors, and synchronized the data collection routine through MATLAB and a hardware pulse for an integrated percussion experiment

LEADERSHIP INITIATIVES

Design, Build, Fly, Notre Dame, Indiana   January 2017-July 2022
President & Mentor
- Led 25 student engineers split into five technical subteams to design, manufacture, test, and present multiple iterations of a remote-controlled aircraft to meet mission requirements of annual AIAA Design, Build, Fly international competition
- Ran day-to-day club operations, organized schedule, budget, and meeting plans, and oversaw engineering design decisions
- Increased quality of documentation and established a mentoring program with Notre Dame alumni working for Boeing
- Improved the club from finishing in the lower tier of the pool to finishing in 7th place out of 100 teams in 2021

Filtre Biosand Haiti, Léogâne, Haiti   August 2018-May 2020
Project Founder
- Assembled team of four engineers to complete a human-centered design thinking project to increase access to clean water
- Recruited six local community members to serve as the focal for each of the six "zones" (neighborhoods) in Léogâne, Haiti
- Collaborated directly with zone leaders and two translators to survey local residents and conduct focus groups in Creole

- Organized seven parallel brainstorming sessions in each Léogâne zone and on campus at the University of Notre Dame
- Designed innovative biosand filter using materials local to Leogane at 50% less cost than other biosand filters on market
- Developed extensive instruction manual with pictures, videos, and captions in Creole using prototyped proof-of-concept
- Co-designed a three-tier social business plan to enable community members to build biosand filters using local materials

PROFESSIONAL ENGINEERING EXPERIENCE

Boeing Commercial Airplanes, Everett, Washington   January 2022-September 2024
Autonomous Systems Engineer
- Worked with OpenCV, ROS, and Docker containers on project to support visual perception and Simultaneous Localization and Mapping (SLAM) of aircraft as it approaches the runway
- Launched a portable platform to record GPS data with real-time kinematics (RTK) capabilities for runway intruder vehicles
- Established data labeling pipeline with third-party company Appen, ensuring quality labeling of runway-based keypoints
- Supported field test missions on a Cessna Caravan by recording test conditions and solving compute squawks in-air

Insitu, Hood River, Oregon   July 2021-January 2022
Flight Sciences Engineer
- Worked on the Guidance, Navigation, and Control (GNC) team for a six-month rotation with Boeing subsidiary Insitu
- Developed "Troll App" (UDP sender/receiver in C++) to evaluate Troll Systems antenna compatibility with Insitu platforms
- Identified the root issue in over 11 mishaps of the unmanned ScanEagle platform by plotting flight telemetry and evaluating performance in a simulation replay
- Wrote and carried out flight test plans for RQ-21A platform with Insitu to evaluate GPS-independent navigation

Boeing Research & Technology, Tukwila, Washington   July 2020-July 2021
Manufacturing Research & Development Engineer for Commercial Derivative Aircraft
- Worked with aircraft mechanics to design a fastener collar retainer device (US 63/227826 patent pending) that received 1st place and a $10,000 reward in an enterprise-wide innovation competition
- Programmed sensors, motors, and feedback control laws in Python and C++ (Raspberry Pi, Teensy) for hand-controlled mechatronic robotic platform capable of moving a 20,000 pound load
- Advanced new applications for 3D scanners and micro unmanned aerial vehicles (UAVs)
- Designed, prototyped, and implemented 13 innovative and value-driven solutions estimated at $2.5 million in annual savings for the 747, 767 Freighter, KC-46A Pegasus Tanker, and 777/777-9 airplane manufacturing environments
- Championed a novel production device with a 97.3% reduction in time for Method 2 wet installation that earned second place and the People's Choice Award in the 2020 Innovation Grand Challenge for Puget Sound
- Collaborated directly with mechanics and engineering to increase safety and reduce foreign-object debris (FOD)

AWARDS
- Marshall Scholarship (2023)
- US 63/227826 (patent pending) (2021)
- Boeing Defense, Space and Security Foreign-Object Debris Reduction Winner (1st Place, $10,000 award) (2021)
- Boeing Defense, Space and Security Innovation Award (1st Place) (2021)
- Boeing Enterprise Additive Manufacturing Award (3rd Place) (2021)
- Boeing Enterprise Innovation Grand Challenge (2nd Place) (2020)
- Western Golf Association Evans Scholarship award of $200,000 (estimated) (2016-2020)

GRANTS
- College of Engineering through the Grand Challenges Scholars Program to develop Biosand filter in Leogane, Haiti (2019)
- Sorin Fellows Center for Ethics & Culture Grant, Con-Solatio, New York City (2019)
- Nanovic Institute for European Studies spring break research grant of $2000 to study transportation in Spain (2018)
- Kellogg Institute for International Studies / Engineering2Empower grant to Leogane, Haiti to collect research data (2018)
- Nanovic Institute for European Studies summer grant of $5000 to conduct research at Imperial College London (2017)

COMMUNITY SERVICE

Mentor, Evans Scholar Alumni (Seattle, WA), advising career development for current Evans Scholars (present)
Design, Build, Fly Mentor, Boeing (Seattle, WA), connecting Notre Dame Alumni at Boeing with student club on campus (2020-2023)
Boeing Mentor at Tesla STEM High School (Redmond, WA), promoting STEM in high school females (2021)
Community of Sant'Egidio (Rome, Italy & South Bend, IN), visiting the elderly in nursing homes (2019-2020)

INTERESTS & SKILLS
- **General:** mechatronics, machine learning, 3D printing, data science, human-centered design thinking, field testing
- **Skills:** Python (OpenCV, numpy, Pytorch), C++, Linux, Docker, git, ROS, Gazebo, Rviz, MATLAB, SolidWorks, CATIA V5
- **Personal Interests:** basketball, netball, rowing, piano, music, golf, skiing, cycling, baking, teamwork