Kyle Johnson

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EDUCATION

University of Washington, Seattle 2017 - 2026
Paul G. Allen School of Computer Science & Engineering
Ph.D. Thesis: *Battery-free Gram-scale Robots that Move Autonomously*
Thesis Advisors: Vikram Iyer (CSE) and Sawyer Fuller (MechE)
Master of Arts and Science (2022)
GPA: 3.9 / 4.0
Electrical & Computer Engineering Department
Bachelor of Science: Controls, Minor in Mathematics (graduated 2020)
GPA: 3.54 / 4.0

University of South Africa, Cape Town Summer 2019
Symposium Speaker & Student, primarily located at Sinethemba High

Queensland University of Technology Summer 2018
Photographer & Student, *Aeronautics & Astronautics Australia: Design of novel materials and structures: a fusion of art, mathematics, and science* program

AWARDS & FELLOWSHIPS

Graduate

SIGCHI Special Recognition. Link.	2026
ACSE Journal of Aerospace Engineering Outstanding Reviewer. Link.	2025
49th Annual GEM Conference Oral Presentation Competition (1st place)	2025
Black in Robotics Fellowship. Link.	2024
Clean Energy Institute Graduate Fellowship. Link.	2023
Graduate Fellowship for STEM Diversity	2023-2026
Quad Fellowship. Link.	2023
UW Black Graduate Student of The Year Award	2023, 2025
Amazon Science Hub Fellowship. Link.	2022
Marcy Migdal Fellow. Link.	2022
Washington NASA Space Grant Consortium Fellowship	2021-2024
SPEEA ACE Fellowship. Link.	2021-2024
Cadence Fellowship. Link.	2021-2024
NSF Graduate Research Fellowship Program. Link.	2021-2026
National GEM Consortium Fellowship	2021
Generational Google Scholar. Link.	2021
Herbold Fellowship	2021

Undergraduate

Washington Research Foundation Scholarship	2020
Benjamin A. Gilman International Scholarship	2019
Ronald E. McNair Postbaccalaureate Achievement Program Scholarship	2019
UW Electrical Engineering Scholarship	2019
Mart Bert Endowed Scholarship	2019
Office of Minority Affairs & Diversity Recognition Scholarship. Link.	2019
NSF Research Experience for Undergraduates at UW	2018 and 2019
Student of the Year - UW ECE 474 Embedded Systems (PI: Rania Hussein)	2019
Mary Gates Research Scholarship	2018
LSAMP Research Scholarship	2018
Minority Scholars Engineering Program Scholarship	2018
Office of Minority Affairs & Diversity Merit Scholarship	2018
Educational Opportunity Program Travel Scholarship	2018

PUBLICATIONS

In Preparation Submissions

1. Arroyos V., Cora A., Kimanje A., Barrett T., Smith B., Yamada K., Iyer V., R. Shapiro B., **Johnson K.** "CourseSLM: Designing and Evaluating a Privacy-Preserving On-Device AI Assistant for Teachers". *ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)*. (under review May 2026).
2. Elberier T., Arroyos V., **Johnson K.**, Azuh E., Ibarhim M., Heimerl K., Iyer V., Mehta A. "Closed-Loop Vision Inference and Control on Insect-Scale Robots". *IEEE Robotics and Automation Letters (RA-L)*. (in preparation May 2026).
3. Kessler C., **Johnson K.,** Arroyos V., Komendantskaya E., Iyer V., Maria Viola I. "Battery-free Microgliders with Active Steering via Centre-of-Mass Shifting". *Science Robotics*. (in preparation May 2026).
4. Cora A., Diop N., Kimanje A., Alemayehu L., Solyst J., Afenegus A., Iyer V., **Johnson K**. "From Toy To Tool: An Investigation on Student AI Use Cases and Effects of AI Scaffolding on Critical Engagement". *IEEE World Engineering Education Forum (WEEF)*. (in preparation May 2026).
5. **Johnson K.,** Arroyos V., Barrow I., Lyu J., and Iyer V. "FLEABOT: a Field Locomotive Electromagnetic Actuated roBOT". (in preparation May 2026).

Peer Reviewed Journal Articles

1. **Johnson K.,** Arroyos V., Donahoe G., Njie O., Yewondwossen S., Arroyos R., Fuller S., and Iyer V. "Coin-copter: A Stable Near-gram Helicopter with Substantial Payload". *Science Advances.* (in revision May 2026). Acceptance rate: 8.2%
2. **Johnson K**., Arroyos V., Elberier T., Fuller S., Iyer V., and Gollakota S. "Solar-powered Shape-changing Origami Microfliers". *Science Robotics*. 8, eadg4276 (2023). doi:10.1126/scirobotics.adg4276. Acceptance rate: 8.9%
3. Yasuda, Hiromi & **Johnson, Kyle**, et Al. "Leaf-like Origami with Bistability for Self-Adaptive Grasping Motions". *Soft Robotics* (2022). doi: 10.1089/soro.2021.0008. Impact Factor: 6.1

Peer Reviewed Conference Papers

1. Cora A., Arroyos V., Kimanje A., Alemayehu L., Solyst J., Shapiro, R. B., Iyer V., **Johnson K.** "Tool or Toy? Student Views on ChatGPT in Culturally Responsive Computing Education: A Preliminary Investigation". *World Engineering Education Forum – Global Engineering Deans Council (WEEF-GEDC)*, Daegu, Republic of Korea (2025), pp. 1-9, doi: 10.1109/WEEF-GEDC66748.2025.11256481.
2. **Johnson K.,** Arroyos V., Hussein L., Cora A., Sherif E., Garcia C., Barrett T., Uthmaan S., Shirazy S., Cunningham J., Shapiro B., and Iyer V. "Scalable Community Mentorship: A Vision for Engineering Literacy & Access". *World Engineering Education Forum - Global Engineering Deans Council (WEEF-GEDC)*, Sydney, Australia (2024), pp. 1-9, doi: 10.1109/WEEF-GEDC63419.2024.10854949.
3. Cora A., Arroyos V., Hussein L., Iyer V., Shapiro R. B., and **Johnson K**. "Leveraging AI to Improve STEM Engagement for Black and Latine Youth". *2024 Black Issues in Computing Education (BICE)*, Santo Domingo, Dominican Republic, 2024, pp. xxiii-xxiii, doi: 10.1109/BICE60192.2024.00031.
4. **Johnson K.,** Arroyos V., Englhardt Z., Yin D., Patel S., and Iyer V. 2023. "MilliMobile: An Autonomous Battery-free Wireless Microrobot". *In Proceedings of the 29th Annual International Conference on Mobile Computing and Networking (ACM MobiCom '23)*. Association for Computing Machinery, New York, NY, USA, Article 90, 1–16. 10.1145/3570361.3613304. Acceptance rate: 14.7%
5. **Johnson K.**, V. Arroyos, R. Villanueva, A. Schulz, S. Fuller and V. Iyer, "Toward Sub-Gram Helicopters: Designing a Miniaturized Flybar for Passive Stability," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, USA, 2023, pp. 2701-2708, doi: 10.1109/IROS55552.2023.10342256. Acceptance rate: 43%

Patents

1. **Johnson K. C. W.**, Arroyos V., Donahoe G., Fuller S., and Iyer V. 2025. "Coin-Copter: Battery-free Near-gram Helicopter Designs." *U.S. Provisional Patent Application*, filed October 2025.

2. **Johnson K. C. W.**, Arroyos V., Englhardt Z., Yin D., Patel S., and Iyer V. 2024. "Wireless microrobot and operating techniques." *International Patent Application WO 2025/058992* A1 (PCT/US2024/045862), published on March 20th, 2025.
3. **Johnson K. C. W.**, Arroyos V., Villanueva R., Schulz A., Fuller S., and Iyer V. 2023. "Flybar apparatus." *International Patent Application WO 2024/137785* A1 (PCT/US2023/085085), published June 27th, 2024.
4. DeLizo S. W., O'Connor I. D., Avantaggio A., and **Johnson K. C. W.** "Tractor-based trailer clearance and positioning system and method." *U.S. Patent Application 12,272,149* B2 (U.S. Patent App. 17/535,142), issued on April 8th, 2025.

Refereed Posters, Workshops, and Other Publications

1. Arroyos V., Ibrahim M., Mensah E., **Johnson K.,** Fuller S., Iyer V. "Battery-free Computer Vision on Insect-scale Microrobots". *IEEE International Conference on Robotics and Automation (ICRA) Late Breaking, Atlanta, Georgia USA* (2025).
   Impact Factor: 3.4%
2. **Johnson K.,** Arroyos V., Garcia C., Aisha C., Hussein L., Melaku T., Cunningham J., Shapiro B., and Iyer V. "AVELA- A Vision for Engineering Literacy & Access: Understanding Why Technology Alone Is Not Enough". *arXiv Preprint*. doi.org/10.48550/arXiv.2401.14581 (2024).
3. **Johnson K.**, Arroyos V., Yang J. "Leaf-out Origami: Tailorable Fabrications and Applications". *University of California Los Angeles Ronald E. McNair Conference* (2019). Link.
4. Knaus C., Ali S., Garcia-Stubbs D., **Johnson K.**, Mohamud L. "Trauma, Educational Exclusions, and Survival: Examining Global Student Experience & Resilience". *University of South Africa Academic Development* Symposium (2019). Link.

TEACHING

Classes Taught

University of Washington

CSE474: Introduction to Embedded Systems (Spring 2023) – Undergrad class, Lead TA

CSE599U: Advanced topics in Ubiquitous Computing & HCDE (Fall 2022) – Graduate class, Lead TA

AVELA - A Vision for Engineering Literacy & Access

60-hour Introduction to Embedded Systems Robotics Applications – HS/Undergrad class, Lesson Plan Creator
Adopted in 15 classrooms (taught: Fall 2020, Winter 2021, Summer 2021, Fall 2021, Spring 2022, Summer 2023)

40-hour Introduction to Python & Machine Learning – MS/HS class, Lesson Plan Creator
Adopted in 30 classrooms (taught: Spring 2021, Summer 2021, Winter 2022, Fall 2022)

20-hour Innovative Applications of ML in Aerospace Industries – Professional class, Lesson Plan Creator
Adopted in 2 classrooms (taught: Spring 2024)

40-hour Introduction to Data Activism – HS class, Lesson Plan Creator
Adopted in 19 classrooms (taught: Spring 2023, Fall 2023, Winter 2024)

40-hour Introduction to Extended Reality – Professional class, Lesson Plan Creator
Adopted in 25 classrooms

Mentorship

Professionals

Azhar Kimanje (Exonicus, 2023)

Aisha Cora (Amazon, 2020)

Graduates

Colin Kessler (University of Edinburgh Info Ph.D., 2025)

Laila Walker (UW CSE Ph.D., 2024)

Yvonne Amaria (UMich MSE Ph.D., 2024)

Teanna Barrett (UW CSE Ph.D., 2023)

Eman Sherif (UW CSE Ph.D., 2023)

Michael Ibrahim (UW CSE Masters, 2022)

Tilboon Elberier (UCLA ECE Ph.D., 2021)

Undergraduates

David Ogabi (2025)
Isatou Barrow (2024, now at Dell)
Jiuyang Lyu (2024)
Faisal Nurdin (2024)
Giannah Donahoe (2023, now at Microsoft)
Brianna Smith (2023)
Semayat Yewondwossen (2023)
Ousman Njie (2023)
Kalea Yamada (2023)
Shukra Jaliya (2023)
Kevin Hernandez-Ramos (2023, now at Duolingo)
Rogelio Arroyos (2023)
William Vera (2023, now at Meta)
Matiyas Yared (2023)
Be-Emnet Elias (2023)
Dennis Yin (2023)
Maitri Debhia (2023)
Ndeye Diop (2022)
Samira Shirazy (2021)
Saara Uthmaan (2021)
Raul Villanueva (2019, now at Boeing)

INVITED LECTURES & PRESENTATIONS

2026 **Keynote**, Apple CEI: Leadership & Learning Conference
2026 **Colloquium**, Johns Hopkins Laboratory for Computational Sensing & Robotics. Link.
2026 **Colloquium**, UC Berkeley EECS. Link.
2026 **Colloquium**, UW CSE Robotics. Link.
2026 **Presenter**, Black in Engineering Monthly Meeting
2026 **Colloquium**, UC Berkeley Sensor & Actuator Center. Link.
2025 **Colloquium**, Seoul National University STAR Lab
2025 **Presenter**, UW Molecular Information Systems Lab
2024 **Colloquium**, Japan Aerospace Exploration Agency (JAXA). Link.
2024 **Presenter**, Materials Research Society (MRS) Broadening Participation in STEM Symposium. Link.
2024 **Colloquium**, NASA Goddard Space Flight Center Engineering Colloquium. Link.
2023 **Colloquium**, Harvard University Microrobotics Lab
2023 **Presenter**, Machine Learning Dynamical Systems and Control Workshop - NSF CTF. Link.
2023 **Colloquium**, Cornell University Robotics Seminar
2023 **Colloquium**, UC Berkeley Ubiquitous Swarm Lab
2022 **Keynote**, Upward Bound Research for Public Good
2022 **Keynote**, UW Young Black & Gifted Conference
2022 **Panelist**, Ronald E. McNair Fellowship Workshop
2022 **Panelist**, UW Allen School NSF GRFP
2022 **Panelist**, Gabriel E. Gallardo Research Student Leadership & Advocacy Symposium
2020 **Presenter**, UW STARS Undergraduate Seminar
2020 **Panelist**, Brother Initiative Workshop
2019 **Presenter**, UW Ronald E. McNair Conference
2019 **Panelist**, McNair Upward Bound Workshop. Link.
2019 **Panelist**, UW CoE Scholar-Donor Recognition Luncheon

GRANTS & GIFTS

Total Awarded as PI/Co-PI: $2,718,000 Total Awarded: $3,156,000
*Funds awarded as Co-Founder of AVELA are described in more detail below in section ENTREPRENEURSHIP

External: Industry and Foundation

AVELA Co-Founder, Executive Director, **PI** — $108,000
Foundry10 Donations — 2025 – 2026
Grants to support educational research, trainings, and multi-tier near-peer mentorship

AVELA Co-Founder, Executive Director, **PI** — $155,000
Apple Donations — 2024 – 2026
AI tool development on Apple hardware using MLX array framework (social media, content)

AVELA Co-Founder, Executive Director, **PI** — $50,000
BECU People Helping People Award — 2024
Donation for research and educational outreach/training (content)

AVELA Co-Founder, Executive Director, **PI** — $360,000
Reboot Representation Grant — 2023 – 2025
Grant to support research and educational outreach/training for BLNA women (content)

AVELA Co-Founder, Executive Director, **PI** — $100,000
National Urban League Contracts — 2023 - 2026
Contracts to support educational outreach in public schools (CBS News)

AVELA Co-Founder, Executive Director, **PI** — $255,000
SPEEA Aerospace Career Enhancement Contracts — 2023 – 2026
Contracts to support technical trainings for professionals in WA State (content)

AVELA Co-Founder, Executive Director, **PI** — $28,000
Schmidt Futures AI Collaboration Grants — 2023 – 2024
Research conference travel support (content)

AVELA Co-Founder, Executive Director, **PI** — $751,000
Amazon Future Engineers Donations & Grants — 2022 – 2026
Grants to support research and educational outreach/trainings (content)

AVELA Co-Founder, Executive Director, **PI** — $75,000
Additional Donations for research and outreach/trainings (content). — 2022 - 2025

External: Government

AVELA Co-Founder, Executive Director, **Co-PI** — $33,000
Department of Energy, Water Power Technologies Office, Grant — 2025 - 2027
PIN DE-EE0011702, NEPA Control No. GFO-0011702-001, CID Number: GO11702

AVELA Co-Founder, Executive Director, **PI** — $578,000
WA King County 4Culture, Grants — 2024 – 2027
Grants to support research and educational outreach/trainings (content)

AVELA Co-Founder, Executive Director, **PI** — $25,000
City of Seattle Human Services Department (Councilmember Hollingsworth), Grant — 2025
Grants to provide research and training positions in Seattle to promote economic opportunity.

AVELA Co-Founder, Executive Director, **PI** — $50,000
Seattle Public School District, Contracts — 2024 – 2026
Contracts to support educational outreach in the greater Seattle area (content)

Internal: University of Washington

AVELA Co-Founder, Executive Director, **PI** — $150,000
UW Department, Grants — 2019-2025
Grants to create research-based outreach lessons (ECE, CSE, BioEng, MechE, Aero&Astro).

UW Student, Writer — $65,000
UW Student Technology Fee (2024-30), Grant — 2024

UW Student, Writer — $13,000
Washington NASA Space Grant Consortium, Grant — 2023

UW Black Graduate Student Association President, Writer — $20,000
UW Black Opportunity Fund, Grant — 2022-2024

UW AVELA President, Writer — $40,000
Institute for STEM Cells & Regenerative Medicines (ISCRM), Grant — 2021-2025

Lead Student, Writer — $75,000
UW Student Technology Fee (2021-12), Grant — 2020

Lead Student, Writer — $225,000
UW Student Technology Fee (2019-11), Grant — 2019

SCHOLARLY SERVICE

Academic Reviewer

ORCID: 0000-0002-0443-9892

2025 IEEE RoboSoft Conference
2025 Journal of Aerospace Engineering, ISSN: 0893-1321
2024 Nature Communications, ISSN: 2041-1723

Boards

2025 4Culture, King County Funding Agency, Board Member
2024 Hip Hop is Green, nonprofit, Board Member
2022 AVELA - A Vision for Engineering Literacy & Access, nonprofit, Board Chair

Recruiter

University of Washington, Paul G. Allen School for Computer Science & Engineering — *2022 - 2025*

NSBE Conference (Chicago, 2025), Grace Hopper Conference (Philadelphia, 2024), NSBE Conference (Atlanta, 2024), Tapia Conference (Dallas, 2023), NSBE Conference (Anaheim, 2022)

AVELA - A Vision for Engineering Literacy & Access — *2022 - 2025*

GEM Conference (San Diego, 2025), CRA-WP (Denver, 2025), Women in Data Science Worldwide Conference (Puget Sound, 2025) Hip Hop Climate Conference (Seattle, 2024), GEM Conference (Phoenix, 2022), GEM Conference (Houston, 2021)

Organizer

University of Washington Black Graduate Student Association — 2020 - 2025

I founded the BGSA and grew the organization to 250+ members. The BGSA enhances scholarly and professional development of Black graduate students at UW by providing opportunities for service, activism, and academic fellowship by hosting events like Black History Month Speaker Series (2022, 2023, 2024, 2025), UW Black Research Symposium (2021, 2022), UW Black Art Showcase (2023, 2024, 2025), and many more.

University of Washington LSAMP Ambassador — 2018 - 2020

Networked with industries like Google and HashiCorp, and assisted a team of 8 in the planning of workshops and seminars for the 10th Annual PNW LSAMP Conference. Mentored underrepresented students as defined by NSF, promoting community engagement and college retention, and supervised the UW's on campus LSAMP center.

NASA Space Camp & UW Summer Programs — Summer 2019

Designed, built & taught engineering activities that taught groups of 50 students' introductory level coding & hardware skills, helped students build circuits with practical implementations. Collaborated lesson plans with professors and teaching staff to align my engineering activity's learning objectives with WA State Common Core standards and Arduino's best practices

Additional Events — 2019 - 2022

UW GEM Luncheon (2022), Women in Science & Engineering Conference (2020), Discovery Days (2019-2026)

Public Speaking

Fathers and Sons Together Next Generation Level Up Final Celebration (2025), Hip Hop Is Green Final Celebration (2022), Electrical Engineering Undergraduate Orientation (2019), LSAMP 3D Printing & Design Workshop (2019), STEM Study Abroad Workshop (2019)

Participant

NSBE Career Fair (2020), NAAM (2020-2022), Seattle MESA (2019-2022), MLK Coalition (2019-2022)

Professional Memberships

Association for Computing Machinery (2022), Society of Women Engineers (2020), NSBE (2018)

ACADEMIC & INDUSTRY POSITIONS

University of Washington, Seattle

Iyer Lab, Advisors: Vikram Iyer and Sawyer Fuller 2021 – Present

My research focuses on creating autonomous robotic platforms for swarms of millimeter-scale devices capable of crawling, rolling, walking, jumping, gilding, and flying. Designing robots with onboard power, sensing & control allows for these systems to be deployed in dangerous or hard to reach environments and locations at low cost.

Networks & Mobile Systems Lab, Advisor: Shyam Gollakota 2020 – 2021

This research was focused on leveraging the bistability and scalability of leaf-out origami to design a low-power and battery-free robotic system for resource constrained applications. Implementing A3C & PPO Reinforcement Learning algorithms helped define efficient folding patterns for the unique energy landscapes of each structure.

Laboratory for Engineered Materials & Structures, Advisor: Jinkyu Yang 2018 – 2020

I researched centimeter scale leaf-out origami designs, demonstrating that leaf-out origami can kinematically output 150% of the energy input into the system. I fabricated many origami prototypes and proved analytically that tailored leaf-out designs can vary the normalized energy outputs from ~37 E/k_θ to ~62 E/k_θ.

NASA

Goddard Space Flight Center, Advisor: Joanna Joiner 2021 – 2022

This project focused on the LSTM algorithm for a net carbon exchange estimator to incorporate memory effects from historical satellite data. I was able to predict NEE with 73% accuracy, current models have ~65% accuracy.

Whirlpool Corporation

WERLD Intern, Controls Engineer Jun 2020 – Aug 2020

Optimized parameters for multi-state estimator for a washing machine motor using electrical values instead of sensors. MATLAB and Simulink simulations implemented a Kalman filter on various washing machine systems.

ENTREPRENEURSHIP

National Programs

NSF I-Corps, UW CoMotion. "Designing a Flybar for Stabilizing Millimeter-scale Flying Robots" 2023
UW GEM partnership with NSF I-Corps, Program Recruiter. 2022
NSF I-Corps, MIT Spark. "AVELA – A Vision for Electronic Literacy & Access" 2022

Founder/Co-Founder

Hip-Hop Climate Conference & Concert (HHCCC) Founded 2024

Nonprofit (EIN: 99-1450402) conceived by climate advocates aiming to inspire action, promote science-based climate solutions, and unite hip-hop culture with STEM.

AVELA - A Vision for Engineering Literacy & Access (AVELA) Founded 2022

- Nonprofit (EIN: 88-4125697) that leads research and outreach trainings to promote economic opportunities in STEM for underserved and underrepresented students interested in college and STEM careers.
- Have supported 40+ research intern positions, one annual scholarship program, and 6 refereed publications.
- Since 2020, AVELA's 500+ members have partnered with ~100 faculty, schools, and community partners to teach 6,000+ students, culminating in over 110,000 STEM instruction hours (avg. 18+ hours per participant).
- This widescale research and outreach has been covered by *Converge Media, Fox4, the Seattle Medium, Africatown Community Land Trust Newsletter*, and many others.

SELECTED MEDIA COVERAGE

UW CSE, "2026 ACM SIGCHI Awards and Special Recognitions"	May 2026
UW CSE, "I Am CSE: Kyle Johnson"	Mar 2024
NSF Discovery Flies, "Self-Powered Mini Robot"	Dec 2023
Allen School News, "Allen School Ph.D. students Kyle Johnson & Lisa Orii receive Quad Fellowships".	Dec 2022
Amazon, "Amazon and University of Washington Announce inaugural Science Hub Fellows"	Nov 2022
NAAM's October Interactive Story Time, "I Promise, by Lebron James voiced by Kyle Johnson"	Oct 2022
CNET, "These Tiny Sensors Ride the Wind Like Dandelion Seeds"	May 2022
Allen School News, "Kyle Johnson wins 2021 Generation Google Scholarship"	Jul 2021
Allen School News, "Allen School students recognized for excellence in research by the NSF"	Apr 2021