

Nnamdi Chinomso Chikere

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South Bend, Indiana

Education

- 2022–27* **Ph.D. in Electrical Engineering**, University of Notre Dame, Notre Dame, IN
Advisor: Yasemin Özkan-Aydın, Ph.D.
- 2022–24 **M.S. in Electrical Engineering**, University of Notre Dame, Notre Dame, IN
Relevant Coursework: AI Planning for Robotics, Introduction to Deep Learning, Introduction to Bio-Inspired Robotics, Advanced Control Systems, Probability and Random Processes, Soft Robotics
- 2016–21 **B.Engr. in Electrical and Electronics Engineering**, Michael Okpara University of Agriculture, Umudike, Nigeria
First Class Honors

Research Experience

- Aug 2022–Present Graduate Research Assistant, [MINIRO Lab](#), University of Notre Dame, (Advisor: [Yasemin Özkan-Aydın, Ph.D.](#))
- Conduct research on bio-inspired robotic locomotion, developing autonomous systems inspired by flipper-based and flagellar propulsion mechanics for navigation in complex environments.
 - Design and implement adaptive gait strategies with Central Pattern Generators (CPGs), optimization, and terrain-aware learning-based control for robust locomotion across granular and aquatic terrains.
 - Develop and validate control frameworks in ROS, MuJoCo, and Project Chrono, integrating real-time sensor feedback, terrain classification, and robust planning under uncertainty.
 - Published findings in peer-reviewed robotics conferences and journals, and presented at international venues including ICRA.
- Jan 2022–Jun 2022 Undergraduate Research Assistant, [Department of Electrical and Electronics Engineering](#), Michael Okpara University of Agriculture, Umudike, Nigeria
- Assisted in designing and implementing electrical control systems, contributing to experimental projects in renewable energy and embedded systems.
 - Utilized circuit simulation software for analysis and optimization of electronic systems, improving research efficiency and project outcomes.

*Expected.

Teaching

University of Notre Dame

- 2023 **Graduate Teaching Assistant, Autonomous Mobile Robots (EE 40465)**
- Assisted in teaching path planning, localization (EKF, Particle Filters), and SLAM algorithms for mobile platforms.
 - Conducted lab sessions involving ROS-based simulations and hardware implementation on TurtleBot platforms.
- 2023, 2026 **Graduate Teaching Assistant, Experimental Robotics (EE 67078)**
- Mentored students in bio-inspired design, sensor integration, and real-time control of robotic systems.
 - Co-authored a pedagogical study on project-based learning outcomes for this course, accepted for the *2026 ASEE Annual Conference*.
 - Managed laboratory equipment and provided technical support for troubleshooting microcontrollers and actuator dynamics.

Michael Okpara University of Agriculture, Umudike

- 2022 **Undergraduate Teaching Assistant, Control Theory**
- Facilitated tutorial sessions on classical control systems, including Root Locus, Bode plots, and PID controller tuning.
 - Graded coursework and provided feedback on system modeling and stability analysis assignments.

Industrial Experience

- 2026 **Robotics & Controls Engineering Intern (System Analyst), [Intuitive](#), Sunnyvale, CA**
- Designed and tested key product control and safety software algorithms, including calibration and diagnostics, for the da Vinci surgical system.
 - Analyzed complex medical electro-mechanical devices and servo control systems to develop safety and clinical risk mitigation strategies.
- 2019–2020 **Engineering Student Intern, [Expro International Group](#), Port Harcourt, Nigeria**
- Conducted hydrostatic and ultrasonic tests for material reliability in subsea operations.
 - Assisted in the maintenance of critical oil production equipment, analyzing operational data for efficiency improvements.
- 2019 **Engineering Student Intern, [Transmission Company of Nigeria](#), Port Harcourt, Nigeria**
- Performed maintenance activities on critical switchyard and control room equipment.

- Operated and maintained SCADA systems, conducting post-fault analysis to enhance power grid reliability.

Awards & Honors

2026	ND-LEEF Research Grant <i>Amphibious Locomotion Testing of a Bio-Inspired Sea Turtle Robot Across Aquatic-Terrestrial Interfaces</i>
2025–	Leadership Advancing Socially Engaged Research (LASER) Fellowship
2025–	Scientific Artificial Intelligence (SAI) Graduate Fellowship
2025	IEEE ICRA Amphibious Robotics Workshop Best Poster Award
2025	IEEE RAS Travel Grant
2024–	Edison Innovation Fellowship
2024–	James L. Massey Travel Grant
2024–	Charlotte Mangum Student Travel Grant
2024–	BiR Student Conference Travel Grant
2024	Organs and Origins Graduate Fellowship
2023	TEEWS Graduate Fellowship
2022–	Full Tuition Ph.D. Scholarship, University of Notre Dame
2021	Best Graduating Student, Electrical and Electronics Engineering, Michael Okpara University of Agriculture
2021	Best Graduating Student, Class of 2019/2020, Michael Okpara University of Agriculture
2016–20	Federal Government of Nigeria Four-Year Full-Tuition Scholarship Award

Publications

[G Google Scholar](#) | [ResearchGate](#)

† → Equal contribution

Journal Articles

- J1. **Nnamdi C. Chikere**, Fish, F. E. & Ozkan-Aydin, Y. Robust Maneuverability in Flipper-Based Systems Across Complex Terrains. *Bioinspiration and Biomimetics*. <https://doi.org/10.1088/1748-3190/ae0aaa> (2025).
- J2. **Nnamdi C. Chikere**, J. S. M. & Ozkan-Aydin, Y. Embodied Design for Enhanced Flipper-Based Locomotion in Complex Terrains. *Scientific Reports* **15**, 7724. <https://doi.org/10.1038/s41598-025-91948-3> (2025).
- J3. **Nnamdi C. Chikere**, Sofia Lozano Voticky, Q. D. T. & Ozkan-Aydin, Y. Flagellar Swimming at Low Reynolds Numbers: Zoospore-Inspired Robotic Swimmers with Dual Flagella for High-Speed Locomotion. *Bioinspiration and Biomimetics*. <https://doi.org/10.1088/1748-3190/ae1e4b> (2025).
- J4. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. Harnessing Flagella Dynamics for Enhanced Robot Locomotion at Low Reynolds Number. *IEEE Robotics and Automation Letters*, 1–8. <https://doi.org/10.1109/lra.2024.3375711> (2024).
- J5. Buckley[†], J., **Nnamdi C. Chikere**[†] & Ozkan-Aydin, Y. The Effect of Tail Stiffness on a Sprawling Quadruped Locomotion. *Frontiers in Robotics and AI* **10**. <https://doi.org/10.3389/frobt.2023.1198749> (2023).

- J6. Nwokeafor, J. C., Wodi, E. I., Akpiri, B. F., **Nnamdi C. Chikere** & Azubuike, C. O. Drives and Methods of Tracking the Sun's Movement—An Overview. *Journal of Instrumentation and Innovation Sciences*. <https://www.researchgate.net/publication/371724838> (2022).
- J7. Wodi, E. I., Akpiri, B. F., **Nnamdi C. Chikere** & Azubuike, C. O. Third Order Observer Design for a Rotating Energy Harvesting System - A Brief Paper. *Journal of Alternative and Renewable Energy Sources*. <https://doi.org/10.46610/joares.2022.v08i03.002> (2022).
- J8. Ukoima, K. N., Ezeonye, C. S., Abara, I. E. & **Nnamdi C. Chikere**. A Study of the Effects of Proportional, Integral, and Derivative Controller in the Speed Regulation of an Armature Controlled Direct Current Motor. *Journal of Control System and Control Instrumentation* **6**, 5–10. <https://doi.org/10.5281/zenodo.3748749> (2020).
- J9. Ukoima, K. N., Ezeonye, C. S., Uwaoma, M. U. & **Nnamdi C. Chikere**. Rotational Energy Harvesting System: Power Conditioning, Controller, and Observer Design. *Journal of Power Electronics and Devices* **6**, 30–40. <https://doi.org/10.5281/zenodo.3692348> (2020).

Peer-reviewed Conference Proceedings

- C1. Nazaripouya[†], A., **Nnamdi C. Chikere**[†] & Ozkan-Aydin, Y. *Embodied Intelligence through Appendages: Lessons from Biology to Robotics* in IOP Conference Series: Materials Science and Engineering, Volume 1343, 5th International Conference on Embodied Intelligence (EI 2025) 02/04/2025 - 04/04/2025 Online, United Kingdom (2026). <https://iopscience.iop.org/article/10.1088/1757-899X/1343/1/012009/meta>.
- C2. **Nnamdi C. Chikere**, Lubker, J. & Ozkan-Aydin, Y. What supports graduate student success in engineering fields? A scoping review of influences and challenges in 2026 ASEE Annual Conference & Exposition (2026). <https://doi.org/10.18260/1-2--60768>.
- C3. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Hands-on experimental robotics: enhancing undergraduate engagement and research through iterative project-based learning* in 2026 ASEE Annual Conference & Exposition (2026). <https://doi.org/10.18260/1-2--59783>.
- C4. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *How Minimalist Bio-inspired Robots Leverage Embodiment for Locomotion in Challenging Environments* in IOP Conference Series: Materials Science and Engineering, Volume 1343, 5th International Conference on Embodied Intelligence (EI 2025) 02/04/2025 - 04/04/2025 Online, United Kingdom (2026). <https://iopscience.iop.org/article/10.1088/1757-899X/1343/1/012013/meta>.
- C5. **Nnamdi C. Chikere**, Tumbelaka, W., Cosden, K., Hann, G. & Ozkan-Aydin, Y. *Topology and Coordination Govern Reconfigurable Multi-Module Robot Locomotion in Highly Viscous Environments* in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (2026).
- C6. Aydin, E. P., **Nnamdi C. Chikere**, Attupuram, V. & Ozkan-Aydin, Y. *Swimming Dynamics of a Soft Flagellated Robot in Low Reynolds Number Environment* in *Proceedings of the International Symposium on Experimental Robotics (ISER)* **19** (2025). https://minirolab.nd.edu/assets/619148/elif_iser2025_softflagellapaper.pdf.

Working papers

- W1. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Enhancing Amphibious Flipper-Based Locomotion Through Terrain-Dependent Bayesian Optimization of CPG Control* Under review: Advanced Robotics Research. 2026.

Tools & Software

[GitHub](#) | [Portfolio](#)

Technical Skills

Programming & Simulation:	Python, MATLAB, ROS, Gazebo, MuJoCo, NVIDIA Isaac Sim, Project Chrono (PyChrono), Chrono::DEME (Discrete Element Method), PyTorch, TensorFlow, Linux
Embedded Systems:	Raspberry Pi, Arduino, Motor Control, Sensor Integration
Mechanical Design:	SolidWorks, Fusion 360, COMSOL, Finite Element Analysis (FEA)
Rapid Prototyping:	3D Printing (FDM/SLA), CNC Machining, Lathe, Mill
Fabrication & Testing:	Hardware Debugging, Failure Modes and Effects Analysis (FMEA), Design for Manufacturability (DFM), Bill of Materials (BOMs), Reliability Testing

Additional Projects

Bayesian Optimization for CPG-Tuned Turtle Robot Locomotion

- Implemented gait tuning for a sea turtle-inspired robot by combining Hopf Central Pattern Generators (CPGs) with Bayesian optimization to optimize locomotion speed and energy efficiency across different terrains.

Machine Learning for Real-Time Collision Prevention

- Developed an AI-powered anti-collision system using machine learning for real-time object detection to enhance vehicle safety.

Deep Learning-Based Robotic Grasp Detection

- Designed and optimized a deep learning model for robotic grasping detection, improving grasp position estimation on 2D planes.

Presentations

Talks

- T1. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Flipper Morphology and Gaits Shape Turning Performance in a Sea Turtle-Inspired Robot* Society of Integrative and Comparative Biology (SICB 2026). Jan. 2026.
- T2. **Nnamdi C. Chikere**, McElroy, J. & Ozkan-Aydin, Y. *Adaptive Gait Strategies for Multi-Terrain Robotic Locomotion Inspired by Sea Turtles* The Society of Integrative and Comparative Biology (SICB) Meeting. Jan. 2025.
- T3. **Nnamdi C. Chikere**, Voticky, S. L., Tran, Q. D. & Ozkan-Aydin, Y. *A Bioinspired Zoospore Robot for High Speed Locomotion in Low Reynolds Number Environments* The Society of Integrative and Comparative Biology (SICB) Meeting. Jan. 2025.
- T4. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Exploring the Sea Turtle Locomotion Mechanics for Biomimetic Robotic Design* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Oct. 2023.

- T5. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *The Effect of Flagella Stiffness on the Locomotion of a Multi-Flagellated Robot at Low Reynolds Environment* 5th Annual COSE-JAM for Graduate Students & Postdoctoral Fellows, Notre Dame. Dec. 2022.

Posters

- P1. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Sensitivity Analysis of Coupled Hopf Oscillator Dynamics for Controlled Flipper-Driven Robotic Locomotion* Gordon Research Conference/Seminar (GRC/GRS) on Robotics, Ventura, CA, USA. Jan. 2026.
- P2. **Nnamdi C. Chikere**. *Promoting STEM Education in Indiana: Robotics and AI for the Next Generation* 6th Annual Indiana Science Communication Day, Indiana Statehouse, Indianapolis, IN. Mar. 2025.
- P3. **Nnamdi C. Chikere**, Dowling, A. & Ozkan-Aydin, Y. *Bayesian Optimization of CPG Control for Adaptive Flipper-Based Locomotion* Midwest Robotics Workshop (MWRW). June 2025.
- P4. **Nnamdi C. Chikere**, Fish, F. E. & Ozkan-Aydin, Y. *Analyzing Turning Dynamics of a Sea Turtle-Inspired Robot on Terrestrial Environments* The Society of Integrative and Comparative Biology (SICB) Meeting. Jan. 2025.
- P5. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Optimization of CPG Control for Adaptive Flipper-Based Locomotion on Granular Terrain* Machine-Ground Interaction Consortium (MaGIC) Meeting. Sept. 2025.
- P6. **Nnamdi C. Chikere**, Moreno, F. & Ozkan-Aydin, Y. *Swarm of Bioinspired Legged Robots for Collective Object Transport* 17th International Symposium on Distributed Autonomous Robotic Systems (DARS'24). Oct. 2024.
- P7. **Nnamdi C. Chikere** & Ozkan-Aydin, Y. *Innovative Strategies for Robotic Swimmers in Low Reynolds Number Environments: Insights from the Microscopic World* Midwest Robotics Workshop (MWRW). Apr. 2024.

Demonstrations & Tutorials

- D1. **Nnamdi C. Chikere**. *Sea turtle-inspired adaptive gait strategies for multi-terrain robotic locomotion* IEEE International Conference on Robotics and Automation (ICRA 2025) Demonstration. May 2025.
- D2. **Nnamdi C. Chikere**. *Exploring Factors Affecting Flipper-Based Locomotion* IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2024) Demonstration. Oct. 2024.

Selected Media Coverage

2023	Notre Dame News, Robotic Sea Turtle Mimics Uniquely Adaptable Gait [J2]
2023	World Economic Forum, Could these robot sea turtles be used to save the real ones? [J2]
2023	Popular Science, This waddling robot could guide baby turtles to the sea [J2]

Academic Advising

Undergraduate Research Assistants and Interns Mentored

2026	Marina Amigon , EE, University of Notre Dame, <i>Cilia Actuated motion for Low Reynolds Robotic Locomotion</i>
2025 - 2026	Gus Hann, Winston Tumbelaka, Kieran Cosden , EE, University of Notre Dame, <i>Reconfigurable Multi-Robot Systems for Low Reynolds Locomotion</i>
2025	Jacob Oberrieder , EE, University of Notre Dame, <i>Amphibious Sea Turtle-Inspired Robotic Locomotion</i>
2025	Kevin Vuong , EE, University of Notre Dame, <i>MuJoCo Robotics Simulation for Multi-Terrain Studies</i>
2024	Grace Slear , EE, University of Notre Dame, Fernando Moreno , ME, Polytechnic University of Puerto Rico, <i>Bioinspired Multi-Robot Systems for Collective Object Transport</i>
2024	Sofia Lozano Voticky , BME, Pontificia Universidad Católica de Chile, <i>Investigation of Dual Flagellar Swimming at Low Reynolds Numbers</i>
2023	John Simon McElroy , ME, University College Dublin, <i>Adaptive Gait Strategies for Flipper-Based Multi-Terrain Robotic Locomotion</i>
2023	Abby Jordan , EE, University of Notre Dame, <i>Design and Testing of Autonomous Quadrupedal Robots</i>
2023	Genevieve Linezer , Biology, University of Notre Dame, <i>Experimental Robotics</i>

Academic Service

Reviewership

2026–	Reviewer , IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics
2025–	Reviewer , Nature Scientific Reports
2025–	Reviewer , Robotics: Systems and Science
2025–	Reviewer , IEEE RoboSoft
2025–	Reviewer , IEEE/ASME Transactions on Mechatronics
2025–	Reviewer , IOP Publishing
2024–	Junior Reviewer , IEEE Robotics and Automation Letters

Volunteering and Outreach

2026–	Instructor, Notre Dame Lucy Institute TRiO Upward Bound , 2026 Python & Applications of Data Science Workshop Series • Mentored high school students in Python fundamentals, guiding hands-on coding exercises and debugging Jupyter Notebook environments.
2025–	Judge, Middle School IQ Division , 2025 Indiana VEX Robotics State Championship • Evaluated teams' engineering design notebooks, interviews, and performance to determine awards in accordance with REC Foundation guidelines.
2025–	Practice Field Attendant , FIRST® Robotics Competition, FIN District Mishawaka Event • Assisted teams with practice field operations, ensuring smooth and fair use of the robotics testing area.
2024–	Volunteer , University of Notre Dame Graduate Orientation Team • Led campus tours and assisted with providing incoming graduate students with essential orientation resources.
2023–	Grad IEEE Coordinator , Expanding Your Horizons (EYH) • Led hands-on robotics workshops for middle school girls to promote STEM education.

- 2023– **Coach**, Marmon Innovate-a-thon Challenge
- *Mentored undergraduate teams in a competitive engineering innovation challenge based on real-world problems.*
- 2023– **Notre Dame IEEE Graduate Student Member**
- *Assisted in organizing monthly meetings, professional development sessions, and networking events.*

Leadership and Professional Memberships

- 2025– Member, American Society of Engineering Education (ASEE)
- 2023– Member, American Physical Society (APS)
- 2023– Member, Society for Integrative and Comparative Biology (SICB)
- 2021– Member, IEEE Robotics and Automation Society
- 2021– Member, Institute of Electrical and Electronics Engineers (IEEE)
- 2021– Member, Nigerian Society of Engineers (NSE)

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