

# Jingyun Ning

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## Education

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| <b>University of Virginia</b>   | Charlottesville, VA  |
| PhD. in Computer Engineering, GPA: 3.8/4.0                            | Expected Dec. 2024 <b>University of Virginia</b> Charlottesville, VA |
| M.Eng. in Computer Engineering, GPA: 3.5/4.0                          | Jan.2016-Dec.2017 <b>Shanghai University of Engineering Science</b>  |
| Shanghai, China   |  |
| B.Eng. in Automation (Automobile Electronic Engineering), GPA 3.5/4.0 | Sep.2011-Jul.2015  |

## Research Experience

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| <b>Capstone research project, University of Virginia</b>  | Mar. 2018 - Aug. 2018 |
| <ul style="list-style-type: none"><li>Established an autonomous driving environment using Airsim and Unreal Engine.</li><li>Generated hours of driving imagery for dataset collection and preprocessing.</li><li>Constructed an end-to-end deep learning architecture utilizing AlexNet.</li></ul>  |                       |
| <b>Member of team-dMIST, University of Virginia</b>   | Oct. 2018 - Aug. 2020 |
| <ul style="list-style-type: none"><li>Collaborated with two principal investigators on a stormwater management study.</li><li>Built two stormwater systems using the SWMM (Storm Water Management Model) simulator.</li><li>Designed four different rule-based control strategies.</li><li>Implemented a data-driven Model Predictive Control (MPC) for real-time stormwater management.</li></ul>  |                       |
| <b>Leader of team-Vehicle Dynamics &amp; Control, Cavalier Autonomous Racing</b>  | Jun. 2021 - present   |
| <ul style="list-style-type: none"><li>Studied the vehicle dynamics for various types of vehicles and racecars</li><li>Built and refined multiple vehicle models for a full-sized Indy racecar.</li><li>Implemented a pure-pursuit control algorithm on the racecar.</li><li>Implemented Model Predictive Control (MPC) on a bicycle model for real-time dynamic control of the racecar.</li><li>Participated in multiple Indy Autonomous Challenge (IAC) events at racetracks across the United States.</li></ul> |                       |

## Autonomous Racing Competitions

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| <b>Indy Autonomous Challenge at Indianapolis Motor Speedway</b>   | Oct. 23, 2021 |
| <ul style="list-style-type: none"><li>Achieved the status of the fastest American team in the competition.</li><li>Implemented a pure pursuit control algorithm on the AV-21 autonomous racecar.</li><li>Achieved an average lap speed of 126 mph.</li></ul>  |               |
| <b>Indy Autonomous Challenge at CES 2024</b>  | Jan. 6, 2024  |
| <ul style="list-style-type: none"><li>Won 2nd place in the CES 2024 competition.</li><li>Qualified in 1st place and became the top-seeded contender.</li><li>Applied a Model Predictive Control (MPC) algorithm based on a single-track vehicle model.</li><li>Executed multiple high-speed autonomous overtakes at speeds up to 143 mph.</li></ul> |               |
| <b>Indy Autonomous Challenge at Indianapolis Motor Speedway</b>   | Sept. 6, 2024 |
| <ul style="list-style-type: none"><li>Won the time trial competition with a lap time of 52.628 seconds.</li><li>Achieved an average speed of 171.012 mph and experienced 2.25 lateral Gs.</li><li>Set a new world record for autonomous racing speed on a racetrack with a top speed of 184 mph.</li></ul>  |               |

## Publications and Presentations

- Ning, J., Bowes, B. D., Goodall, J. L., & Behl, M. (2022, June). Data-Driven Model Predictive Control For Real-Time Stormwater Management. In 2022 American Control Conference (ACC) (pp. 1438-1443). IEEE.
- Ning, J., & Behl, M. (2023). Vehicle Dynamics Modeling for Autonomous Racing Using Gaussian Processes. arXiv preprint arXiv:2306.03405.
- Ning, J., & Behl, M. (2023, August). Scalable Deep Kernel Gaussian Process for Vehicle Dynamics in Autonomous Racing. In 7th Annual Conference on Robot Learning.
- Chrosniak, T., & Ning, J., & Behl, M. (2024) Deep Dynamics: Vehicle Dynamics Modeling with a Physics-Constrained Neural Network for Autonomous Racing. IEEE Robotics and Automation Letters

- Ning, J., & Behl, M. (2024). Gaussian Processes for Vehicle Dynamics Learning in Autonomous Racing. SAE International Journal of Vehicle Dynamics, Stability, and NVH, 8(10-08-03-0019).
- Presented at American Control Conference (ACC), Atlanta, US, 2022.
- Presented at Conference on Robot Learning (CoRL), Atlanta, US, 2023.

## Teaching Experience

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**Teaching Assistant, F1Tenth Autonomous Racing, University of Virginia**

2021 & 2022

- Prepared ten F1Tenth racecars for student groups, ensuring readiness for practical learning experiences.
- Maintained and optimized the F1Tenth racecars throughout the semester, addressing both software and hardware aspects.
- Conducted office hours and managed grading responsibilities.
- Received the Outstanding Graduate Teaching Award.

## Skills

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**Technical Skills:** Python, ROS2, PyTorch, C++, MatLab, Docker

**Soft Skills:** Problem Solving, Communication, Leadership, Time Management, Team Collaboration.