

## Muchen Sun

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| CONTACT INFORMATION      | Department of Mechanical Engineering,<br>Northwestern University,<br>2145 Sheridan Road, Evanston, IL 60208  | (773) 313-5186<br><a href="mailto:muchensun2021@u.northwestern.edu">muchensun2021@u.northwestern.edu</a><br><a href="https://muchensun.github.io">https://muchensun.github.io</a> |
| EDUCATION                | <b>Northwestern University</b><br>Ph.D. in Mechanical Engineering  | EVANSTON, IL<br>2019.9 – Present  |
|                          | <b>Lanzhou University</b><br>B.E. in Computer Science and Technology   | GANSU, CHINA<br>2015.9 – 2019.6   |
| PUBLICATION              | <p>[1] <b>Sun, Muchen</b>, Francesca Baldini, Peter Trautman, and Todd Murphey. "Move Beyond Trajectories: Distribution Space Coupling for Crowd Navigation." In <i>Robotics: Science and Systems</i>. 2021.</p> <p>[2] <b>Sun, Muchen</b>, Ian Abraham, and Todd Murphey. "Ergodic Coverage for Exploration-Exploitation in Active SLAM." <i>IEEE Robotics and Automation Letters</i> (Submitted).</p>  |   |
| RESEARCH EXPERIENCES     | <b>Social Robot Navigation</b><br>Northwestern University, IL 2021.9 - Present <ul style="list-style-type: none"><li>Co-wrote this joint grant between Northwestern University and Honda Research Institute (USA).</li><li>Lead research team at Northwestern University to study human-robot interaction in extremely dense environments [1].</li></ul> <b>Robotic Active Learning in Uncertainty Environments</b><br>Northwestern University, IL 2019.12 - Present <ul style="list-style-type: none"><li>Study how motion planning could benefit robots learning unknown environments under noisy sensors. Examples include active exploration for simultaneous localization and mapping (SLAM) [2].</li></ul> <b>Swarm Robots</b><br>Northwestern University, IL 2019.10 - 2020.3 <ul style="list-style-type: none"><li>Developed a central monitor with GUI for controlling and communicating with the swarm robots.</li></ul> <b>StuPyd: Language For Programming Education</b><br>Project Website: <a href="https://github.com/StuPyd/stupyd-lang">https://github.com/StuPyd/stupyd-lang</a><br>Lanzhou University, China 2018.5 – 2018.11 <ul style="list-style-type: none"><li>Lead the team to design and implement a programming language for undergraduate programming education.</li></ul> |   |
| TALKS & SCIENCE OUTREACH | <b>Distribution Space Coupling for Crowd Navigation</b><br><i>Robotics: Science and Systems Spotlight Talk</i><br>Recording: <a href="https://www.youtube.com/watch?v=nBFC2rLhN1U">https://www.youtube.com/watch?v=nBFC2rLhN1U</a><br>Virtual, 2021.6  |   |
|                          | <b>Robots as New Drivers: Robot Navigation in Human Crowds</b><br><i>Northwestern Research Communication Training Program</i><br>Recording: <a href="https://www.youtube.com/watch?v=fAuqjoW5e7k">https://www.youtube.com/watch?v=fAuqjoW5e7k</a><br>Virtual, 2020.8   |   |

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| OPEN-SOURCED<br>SOFTWARE  | <b>Ergodax: Jax-Based Toolbox for Ergodicity-Related Computation</b>   |  |
|                           | Project Website: <a href="https://github.com/MurpheyLab/ergodax">https://github.com/MurpheyLab/ergodax</a>                       |  |
|                           | <b>DistNav: Toolbox for Distribution Space-Coupled Crowd Navigation</b>  |  |
|                           | Project Website: <a href="https://github.com/MurpheyLab/DistNav">https://github.com/MurpheyLab/DistNav</a>                       |  |
| TEACHING                  | <b>Joey: Customizable ROS Joystick Driver for Differential-Drive Robots</b>  |  |
|                           | Project Website: <a href="https://github.com/MuchenSun/Joey">https://github.com/MuchenSun/Joey</a>                               |  |
|                           | <b>Interactive Tutorial for Gaussian Processes</b>   |  |
|                           | Project Website: <a href="https://github.com/MuchenSun/another_gp_tutorial">https://github.com/MuchenSun/another_gp_tutorial</a> |  |
| LEADERSHIP AND<br>SERVICE | 2020 Fall  | TA for <i>ME314: Machine Dynamics</i> at Northwestern University<br><i>Held office hours, designed weekly programming assignments, taught two lectures.</i>    |
|                           | 2021 – 2019  | Co-founder & President of <i>Northwestern Public Speaking Club</i><br>( <a href="https://nupublicspeaking.github.io">https://nupublicspeaking.github.io</a> ). |
|                           | 2020   | Certification in Research Communication Training Program<br>(RCTP) at Northwestern University.   |
| TECHNICAL<br>SKILLS       | <b>Programming Languages:</b>  | Python, C/C++, MATLAB  |
|                           | <b>Programming Frameworks:</b>   | ROS, CUDA, MPI, PCL, OpenCV  |
|                           | <b>Other Programming Tools:</b>  | Make, Git, Docker, ANTLR, L <sup>A</sup> T <sub>E</sub> X  |