

# DUN YANG

Beihang University, Beijing, China

Mar, 2022

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## EDUCATION

### M.S. in Dynamics, Systems & Controls

Beihang University

Beijing, China

Sep 2020 – Expected Jan 2023

- **Overall GPA: 95.6/100 (rank 1/230)**
- Selected Awards: Top-level Fellowship, Outstanding Student (top 3%)
- Selected Courses: RL, Advanced Dynamics, Control, Dynamics.
- Thesis: Autonomous motion policy of bionic robot in unstructured environments.

### B.S. in Engineering Mechanics

Dalian University of Technology

Liaoning, China

Sep 2016 – Jun 2020

- **Overall GPA: 3.88/4 (rank 1/104)**
- Selected Awards: Excellent Undergraduate, National Scholarship (top 3%)
- Selected Courses: Mechanics, FEM, Numerical Calculation, PDE
- Thesis: End-to-end neural network control based on NEAT algorithm for bio-robot gait.

## RESEARCH INTEREST

- **Robot Learning & Learning/Data-Based Planning and Control for Bio-robotics**

## PUBLICATIONS

- **Dun Yang**, Shuai Yang and Yang Yu. “Sea Urchin Robot for Autonomous Planetary Surface Exploration Based on Model-Free RL Locomotion Policy”, Under review, IROS 2022.[[Website](#)]
- **Dun Yang**, Shuai Yang, Yang Yu and Wang Qi. “Design and Experiment of Complex Terrain Adaptive Robot Based on Deep Reinforcement Learning”, Under review, Journal of Astronautics.
- Shuai Yang, Yang Yu, **Dun Yang** and Qishao Wang. “Twelve-legged symmetrical robot”, Submitted, [Utility Model:CN202120637760.9].
- Zhenhuan Zhou, Shenbo Zhu, Yiwen Ni, Quanquan Tong, **Dun Yang**, Yang Bai. “Free vibration analysis software of functionally graded cylindrical shell based on symplectic algorithm”, [Software copyright, (Patent number:2018SR587264)]

## RESEARCH EXPERIENCE

### Beihang University (Department of Dynamics, Systems & Controls)

Beijing, China

Advisor [Prof. Yang Yu](#)

Mar 2021 – Present

#### “Bionic Sea Urchin Robot with Self Adaptability to Complex Terrain”

- Brief overview: Designing a kind of bionic sea-urchin (spherical twelve-legged) robot for planet unstructured unknown environment exploration tasks.
- Studying and establishing the autonomous motion policy of the robot.
- Developed sample efficient, end-to-end RL algorithms allowing robots to fast adapt to varying terrains.
- Implemented algorithms using PyTorch and evaluated performance on real-world and PyBullet simulated robots.

### Dalian University of Technology (Department of Engineering Mechanics)

Liaoning, China

Research Assistant, Advisor [Prof. Haijun Peng](#)

Nov 2019 – May 2020

#### “Research on autonomous adaptation algorithm of the multi-joint crawling robot to strange terrain”

- Brief overview: Design a closed-loop robot, and use a genetic algorithm to obtain the optimal motion controller for unfamiliar and complex terrain.
- Use the Lagrangian equations to derive a dynamic model considering contact force.
- Design robot gait training framework using NEAT (Evolving Neural Networks through Augmenting Topologies)
- Implement the locomotion policy and evaluate the performance on a Pymunk simulated robot.
- **Outstanding Undergraduate Thesis**

### Zhejiang University, Dalian University of Technology

Zhejiang & Liaoning, China

Advisor [Prof. Hongtao Wang](#), Advisor [Prof. Haijun Peng](#)

May 2018 – Aug 2019

#### “Robot Structural Design and Implementation”

- Build a 6-bar tensegrity robot structure and simulate it in v-rep
- Summer Deep Dynamics Robot Practice Course: Reproduce the mechanical structure and drive mechanism of the MIT Mini-Cheetah robot. [[Website](#)]

## SELECTED PROJECTS

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### Multibody System Simulation - BUAA

Jun 2021

#### “Ellipse Disk Pure Rolling Simulation Based on First Kind Lagrangian Equations”

- Use Lagrangian equations to build a kinetic model. Establish constraint conditions of pure rolling of an elliptic disk by two methods, and prove their equivalence. Simplify Differential-Algebraic Equations (DAE) using the Baumgarte Constraint Violation and perform numerical calculations in MATLAB.
- **Get the highest score for the course (Top 1 of class)**

### Nonlinear Dynamic Systems - BUAA

May 2021

#### “Overview: Proof and Reversal of Aizeman Stability (An Absolute Stability in nonlinear systems)”

- Introducing the research history of Aizeman Stability. Reorganizing Aizeman Stability Criterion and its proof. Clarifying and supplying the process of overturning the Aizeman Stability Criterion based on Leonov Method
- **Get the highest score for the course (Top 1 of class)**

### Parallel Programming - DUT

Nov 2018 – Nov 2019

#### “Parallel Algorithm Design Based on MPI Method”

- Using C++/C to realize parallel programming based on MPI to Solve Sequence Problems and Plane Truss Stress.
- **Get the highest score for the course (Tied for first place in 130)**

## SELECTED AWARDS AND HONORS

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|--|-------------------|
| • 2021 Robot competition of University in Beijing                  | First Prize (5%)  |
| • 2021 Academic Forum of College                                   | First Prize (15%) |
| • 2021 Outstanding Graduate  | Top 3%            |
| • 2021 CATIC Scholarship   | 5 of 15000        |
| • 2020 Admission Scholarships                                      | Top 5%            |
| • 2020 Outstanding Undergraduate Graduate of Liaoning Province     | Top 1%            |
| • 2019 National Scholarship  | Top 1%            |
| • 2019 Interdisciplinary Contest in Modeling (ICM)                 | First Prize (6%)  |
| • 2019 Mathematical modeling competition in northeastern provinces | First Prize (10%) |
| • 2016 Qianlingxi Mechanics Scholarships                           | Top 5%            |

## WORK EXPERIENCE

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### Beihang University: *Planetary Rob-lab*

Beijing, China

#### Leader of graduates in Robot Project

Sep 2021 – Expected Jan 2023

- Laboratory construction and planning, in overall charge of sea urchin research and product development.

### Beihang University: *Theoretical Mechanics-A*

Beijing, China

#### Teaching Assistant

Sep 2020 – Expected Jan 2023

- Responsible for undergraduates: homework Q & A, credit consultation and final exam scoring

### Beihang University: *Student Union Presidium*

Beijing, China

#### Member of the Graduate Committee

Sep 2020 – Expected Sep 2022

- Plan and organize outdoor practical activities, academic lectures, intercollegiate fellowship for more than 2000 graduate students in universities in Beijing, such as Peking University, Tsinghua University.

### Ethnic-Primary School of Yibin

Sichuan, China

#### Short-term Volunteer Teacher (outstanding volunteers)

Jun 2018 – Aug 2018

- Responsible for junior high school physics curriculum, lesson preparation, teaching and homework correction

### Taikuo community in Nansha street, Dalian

Liaoning, China

#### Community Workers, part-time job

Feb 2017 – Mar 2018

- Organize activities and meetings, popularize basic knowledge for low-income groups and the elderly.

### Chuang Yifang- Campus startup studio

Liaoning, China

#### Startup Co-founder

Jun 2017 – Jul 2018

- Campus cultural creative products design, sales, product channel contact, and team management.

## ADDITIONAL INFORMATION

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**Programming Languages:** Python, C/C++, MATLAB

**Tools:** PyTorch, Catia, Linux, Tensorflow, Abaqus, Ansys, PyBullet, V-rep, Mujoco, Pr, Latex

**Skills:** Team Management, CAD, CAE, Machine Learning

**Interests:** Fitness, Philosophy, Music