

# Hao Zhu

*PhD student*

Neurorobotics Lab  
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## Education

- 2024– **PhD in Computer Science**, *University of Freiburg*, Freiburg i. Br., Germany  
Advisors: Prof. Joschka Boedecker, Prof. Ilka Diester
- 2021–2023 **M.Sc. in Neuroscience**, *University of Freiburg*, Freiburg i. Br., Germany  
GPA - 3.8 | German grade - 1.3  
Thesis: *Deciphering Decision Making with Inverse Reinforcement Learning*  
Advisors: Prof. Ilka Diester, Prof. Joschka Boedecker
- 2016–2020 **B.Sc. Chemical Biology**, *Nankai University*, Tianjin, China  
GPA - 3.6 | average grade 89.4/100  
Thesis: *Identification of Functional Residues in the Human Protoporphyrinogen Oxidase with the Network Model and Site-Directed Mutagenesis*  
Advisors: Prof. Xin Wen, Prof. Zhen Xi

## Academic Experience

- 2024– **Scientific Researcher**, *Neurorobotics Lab, University of Freiburg*, Freiburg i. Br., Germany  
Part of the collaborative research project *IN-CODE* on 1) fundamental research of deep learning and (inverse) reinforcement learning, and 2) application of machine learning in neuroscience.
- 2022–2023 **Research Intern**, *Optophysiology Lab, University of Freiburg*, Freiburg i. Br., Germany  
Led a research project on the mathematical modeling of rodent complex foraging behavior via (inverse) reinforcement learning.
- 2022 **Research Intern**, *Straw Lab, University of Freiburg*, Freiburg i. Br., Germany  
Led a research project on 1) developing Kalman filter auto-tuning algorithm for animal tracking, and 2) designing event-camera-based lock-on tracker prototype, steering multiple cameras for tracking bees in the wild.
- 2017–2021 **Undergraduate Researcher/Research Assistant**, *State Key Laboratory of Elemento-organic Chemistry, Nankai University*, Tianjin, China  
Led the National Training Program of Innovation and Entrepreneurship for Undergraduates project titled *Computational Simulation and Biological Verification for Different Species of Protoporphyrinogen IX Oxidase Amino Acid Interactions*, aiming at identifying key amino acid residues in protoporphyrinogen oxidase with computational quantum mechanics, molecular dynamics simulation, and graph theory.

## Awards

- 2020 **Innovative Scientific Research Award for College Students**, *Nankai University*, China  
Excellence Award
- 2018 **Asymchem Scholarship of Chemistry College**, *Nankai University*, China
- 2017 **Asymchem Scholarship of Chemistry College**, *Nankai University*, China

## Membership

- 2024– IEEE
- 2024– IEEE Computational Intelligence Society

## Publications

Hao Zhu, Brice De La Crompe, Gabriel Kalweit, Artur Schneider, Maria Kalweit, Ilka Diester, and Joschka Boedecker. L (M) V-IQL: Multiple intention inverse reinforcement learning for animal behavior characterization. *arXiv preprint arXiv:2311.13870*, 2023.

Baifan Wang, Zijuan Zhang, Hao Zhu, Congwei Niu, Xin Wen, and Zhen Xi. The hydrogen bonding network involved Arg59 in human protoporphyrinogen IX oxidase is essential for enzyme activity. *Biochemical and Biophysical Research Communications*, 557:20–25, 2021.

## References

- **Prof. Joschka Boedecker**  
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- **Prof. Ilka Diester**  
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