

# Boyuan Chen

Assistant Professor, Duke University  
Dept. of Mechanical Engineering & Materials Science  
Dept. of Electrical and Computer Engineering  
Dept. of Computer Science

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## Research Interests

Robotics, Computer Vision, Machine Learning, Human-AI Teaming, Robotics/AI for Scientific Discovery

## Appointments

### **Duke University**

Assistant Professor, Department of Mechanical Engineering & Materials Science	2022.7 – Present
Assistant Professor, Department of Electrical and Computer Engineering	2022.7 – Present
Assistant Professor, Department of Computer Science	2022.7 – Present
Strategic Advisor of Autonomy and Robotics, Dean's Office, Pratt School of Engineering	2024.2 – Present

### **Allen Institute for AI**

Research Scientist Intern	June. 2021 – Aug 2021
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## Education

<b>Columbia University</b> Ph.D., Computer Science	Jan. 2018 – June 2022
<b>Columbia University</b> M.S., Computer Science	Sept. 2016 – Dec 2017
<b>University of Manchester</b> Undergraduate Thesis, Control System	Jan. 2016 – June 2016
<b>Jilin University</b> B.S., Biomedical Engineering and Electrical Engineering	Sept. 2012 – June 2016

## Publications

28. Sam A. Moore, Brian P. Mann, Boyuan Chen  
Automated Global Analysis of Experimental Dynamics through Low-Dimensional Linear Embeddings  
Preprint, 2024  
The Association for the Advancement of Artificial Intelligence (**AAAI**) **Fall Symposium**, 2024. Oral Talk.  
[🔗 Project Webpage](#)
27. Kuang Huang\*, David Cho\*, Boyuan Chen  
Automatic Discovery of Continuous Dynamics From Videos  
Preprint, 2024  
The Association for the Advancement of Artificial Intelligence (**AAAI**) **Fall Symposium**, 2024. Oral Talk.  
[🔗 Project Webpage](#)
26. Zhengran Ji, Lingyu Zhang, Boyuan Chen  
Enabling Multi-Robot Collaboration from Single-Human Guidance  
Preprint, 2024

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25. Boxi Xia, Bokuan Li, Jacob Lee, Michael Scutari, Boyuan Chen  
The Duke Humanoid: Design and Control for Energy Efficient Bipedal Locomotion using Passive Dynamics  
Preprint, 2024  
[🔗 Project Webpage](#)
24. Ryan Ringel\*, Zachary Charlick\*, Jiaxun Liu\*, Boxi Xia, Boyuan Chen  
Text2Robot: Evolutionary Robot Design from Text Descriptions  
Preprint, 2024  
1<sup>st</sup> Place in Innovation at Virtual Creature Competition at Conference on Artificial Life (**ALIFE**), 2024  
[🔗 Project Webpage](#)
23. Yanbaihui Liu, Boyuan Chen  
WildFusion: Multimodal Implicit 3D Reconstructions in the Wild  
Preprint, 2024  
[🔗 Project Webpage](#)
22. Lingyu Zhang, Zhengran Ji, Boyuan Chen  
CREW: Facilitating Human-AI Teaming Research  
Preprint, 2024  
[🔗 Project Webpage](#)
21. Lingyu Zhang, Zhengran Ji, Nicholas R. Waytowich, Boyuan Chen  
GUIDE: Real-Time Human-Shaped Agents  
Conference on Neural Information Processing Systems (**NeurIPS**), 2024  
[🔗 Project Webpage](#)
20. Jiaxun Liu, Boyuan Chen  
SonicSense: Object Perception from In-Hand Acoustic Vibration  
Conference on Robot Learning (**CoRL**), 2024  
[🔗 Project Webpage](#)
19. Yinsen Jia, Boyuan Chen  
ClutterGen: A Cluttered Scene Generator for Robot Learning  
Conference on Robot Learning (**CoRL**), 2024  
[🔗 Project Webpage](#)
18. Pingcheng Jian, Easop Lee, Zachary Bell, Michael M. Zavlanos, Boyuan Chen  
Perception Stitching: Zero-Shot Perception Encoder Transfer for Visuomotor Robot Policies  
Transactions on Machine Learning Research (**TMLR**), 2024  
[🔗 Project Webpage](#)
17. Gabe Guo, Judah Goldfeder, Ling Lan, Aniv Ray, Albert Hanming Yang, Boyuan Chen, Simon JL Billinge, Hod Lipson  
Towards End-to-End Structure Determination from X-Ray Diffraction Data Using Deep Learning  
npj Computational Materials (**npj Computational Materials**), 2024
16. Yuhang Hu, Boyuan Chen, Jiong Lin, Yunzhe Wang, Yingke Wang, Cameron Mehlman, Hod Lipson  
Human-Robot Facial Co-Expression  
Science Robotics (**Science Robotics**), 2024
15. Pingcheng Jian, Easop Lee, Zachary Bell, Michael M. Zavlanos, Boyuan Chen

Policy Stitching: Learning Transferable Robot Policies

Conference on Robot Learning (**CoRL**), 2023

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14. Boyuan Chen, Robert Kwiatkowski, Carl Vondrick, Hod Lipson  
Full-Body Visual Self-Modeling of Robot Morphologies  
**Cover Article**, Science Robotics (**Science Robotics**), 2022  
[Project Webpage](#)
13. Boyuan Chen, Kuang Huang, Sunand Raghupathi, Ishaan Chandratreya, Qiang Du, Hod Lipson  
Automated Discovery of Fundamental Variables Hidden in Experimental Data  
**Cover Article**, Nature Computational Science (**Nature Computational Science**), 2022  
[Project Webpage](#)
12. Boyuan Chen, Mia Chiquier, Hod Lipson, Carl Vondrick  
The Boombox: Visual Reconstruction from Acoustic Vibrations  
Conference on Robot Learning (**CoRL**), 2021  
[Project Webpage](#)
11. Boyuan Chen, Yuhang Hu, Robert Kwiatkowski, Shuran Song, Hod Lipson  
Visual Perspective Taking for Opponent Behavior Modeling  
International Conference on Robotics and Automation (**ICRA**), 2021  
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10. Boyuan Chen, Yuhang Hu, Lianfeng Li, Sara Cummings, Hod Lipson  
Smile Like You Mean It: Driving Animatronic Robotic Face with Learned Models  
International Conference on Robotics and Automation (**ICRA**), 2021  
[Project Webpage](#)
9. Yiqing Liang, Boyuan Chen, Shuran Song  
SSCNav: Confidence-Aware Semantic Scene Completion for Visual Semantic Navigation  
International Conference on Robotics and Automation (**ICRA**), 2021  
[Project Webpage](#)
8. Boyuan Chen, Yu Li, Sunand Raghupathi, Hod Lipson  
Beyond Categorical Label Representations for Image Classification  
International Conference on Learning Representations (**ICLR**), 2021  
[Project Webpage](#)
7. Boyuan Chen, Carl Vondrick, Hod Lipson  
Visual Behavior Modelling for Robotic Theory of Mind  
Scientific Reports (**Scientific Reports**), 2021  
[Project Webpage](#)
6. Zanwar Faraj, Mert Selamet, Carlos Morales, Patricio Torres, Maimuna Hossain, Boyuan Chen, Hod Lipson  
Facially Expressive Humanoid Robotic Face  
HardwareX 2021
5. Boyuan Chen, Shuran Song, Hod Lipson, Carl Vondrick  
Visual Hide and Seek  
**Best Poster Award**, Conference on Artificial Life (**ALIFE**), 2021  
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4. Dave Epstein, Boyuan Chen, Carl Vondrick  
Oops! Predicting Unintentional Action in Video  
Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020  
[Project Webpage](#)
3. Iretiayo Akinola, Jacob Varley, Boyuan Chen, Peter Allen  
Workspace Aware Online Grasp Planning  
International Conference on Intelligent Robots and Systems (**IROS**), 2018  
[Project Webpage](#)
2. Boyuan Chen, Harvey Wu, Warren Mo, Ishanu Chattopadhyay, Hod Lipson  
Autostacker: A Compositional Evolutionary Learning System  
The Genetic and Evolutionary Computation Conference (**GECCO**), 2018
1. Iretiayo Akinola, Boyuan Chen, Jonathan Koss, Aalhad Patankar, Jake Varley, Peter Allen  
Task Level Hierarchical System for BCI-enabled Shared Autonomy  
International Conference on Humanoid Robots (**Humanoids**), 2017  
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### Teaching Experience

<b>Robot Learning</b>	Fall 2024
<b>Robot Studio</b> (Instructor: 4.22/5)	Spring 2024
<b>Robot Learning</b> (Instructor: 4.68/5)	Fall 2023
<b>Robot Studio</b> (Instructor; Score: 5/5)	Spring 2023
<b>Robot Learning</b> (Instructor; Score: 4.55/5)	Fall 2022
<b>Computer Vision</b> (Teaching Assistant)	Fall 2018
<b>AI Safety, Ethics and Policy</b> (Teaching Assistant)	Spring 2018
<b>Humanoid Robotics</b> (Teaching Assistant)	Spring 2017

### Awards and Honors

1 <sup>st</sup> Place in Innovation at Virtual Creature Competition, ALIFE	July 2024
Thomas Lord Educational Innovation Grant Program Award	July 2024
ALIFE Best Poster Award	July 2020
ALIFE Student Scholarship Award	May 2020
Facebook Research Award	Oct. 2019
ACM Student Travel Grant	July 2018
Chinese National Excellent Undergraduate Fellowship (1/2000)	May 2015
Space Technology Innovation Fellowship, Chinese Academy of Science	Dec. 2014
JLU Outstanding Graduates	Mar. 2016
JLU Top 10 Electrical Engineering Student	Nov. 2016
First Prize in RobotChallenge Competition (Domestic)	Aug. 2015
JLU First Class Fellowship	2014–2015
Dong Rong Fellowship	2013–2014
First Prize in Electronic Design Contest, JLU	Mar. 2013

### Graduate Students and Postdocs

#### Current PhD Students, Postdocs and Research Associates:

1. **Boxi Xia** – Postdoc, 2023-present

2. **Christof Fehrman** – Postdoc, 2025-present
3. **David Cho** – PhD student, 2023-present, Computer Science
4. **Easop Lee** – PhD student, 2023-present, Electrical and Computer Engineering
5. **Jiaxun Liu** – PhD student, 2023-present, Mechanical Engineering and Material Science
6. **Lingyu Zhang** – PhD student, 2024-present, Electrical and Computer Engineering
7. **Pingcheng Jian** – PhD student, 2023-present, with Michael Zavlanos, Electrical and Computer Engineering
8. **Ravi Prakash** – PhD student, 2022-present, with Patrick Codd, Mechanical Engineering and Material Science
9. **Sam Moore (NSF PhD Fellow)** – PhD student, 2022-present, Mechanical Engineering and Material Science
10. **Yanbaihui (Evelyn) Liu** – PhD student, 2023-present, Mechanical Engineering and Material Science
11. **Yinsen Jia** – PhD student, 2023-present, Electrical and Computer Engineering
12. **Yixuan Yang** – PhD student, 2024-present, Electrical and Computer Engineering
13. **Haoran Chen** – Research Associate, 2024-present
14. **Nils Roede** – Research Associate, 2024-present
15. **Ying Jiang** – Research Associate, 2024-present

Current Master / Undergraduate Students (Committee Chair)

1. **Brandon Wang** – 2024-present
2. **Matthew Lutes** – 2024-present
3. **Chris Oswald** – 2024-present
4. **Michael Scherk** – 2024-present
5. **Max Li** – 2024-present
6. **Jonathan Hyun** – 2024-present
7. **Zhengran Ji** – 2023-present
8. **Nicole Errera** – 2023-present
9. **Zach Charlick (Pratt Fellow)** – 2023-present
10. **Ryan Ringel** – 2023-present
11. **Jacob Lee** – 2023-present
12. **Michael Scutari (Pratt Fellow)** – 2023-present
13. **Alex Whitehead** – 2023-present

University / Student Initiative Advisor

- **Faculty Advisor: Duke Robotics Club** (2023-present)
- **Faculty Advisor: Duke AERO** (2024-present)
- **Technical Mentor & Client: Duke University First-Year Design EGR 101** (2024-present)
- **Duke 360 Coach** (2024-present)

Past Master / Undergraduate Students (Committee Chair)

1. **Drew Council** – 2023-2024
2. **Tate Staples** – 2023-2024
3. **Rebecca Edelman** – 2023-2024
4. **Daniel Ghasemfar (Pratt Fellow)** – 2022-2024
5. **Charlotte Silver** – 2023-2024
6. **Ryan Rodriguez** – 2022-2024
7. **Edwin Ma** – 2024
8. **Eamon Ma** – 2023-2024
9. **Joseph Schwartz** – 2024
10. **Jiaxun Liu** – 2022-2023, Acoustic Perception for Robotics
11. **Sida Zhu** – 2022- 2023, Development of Human-AI Teaming Framework
12. **Wanqian Chen** – 2023
13. **Haoran Zhang** – 2023
14. **Hae Young Jang** – 2023
15. **Rui Cao** – 2023
16. **Harish Yerra** – 2023
17. **Annie Tighe** – 2022-2023
18. **Katie Spencer** – 2022-2023
19. **Alex Kumar** – 2023
20. **Andy Lu** – 2022
21. **Anran Chen** – 2022
22. **Darrell Dai** – 2022

23. **Henry Barklam** – 2022
24. **Jiyun Hyo** – 2022
25. **Yujie Zheng** – 2022

#### Past High School Students

1. **Eli Pratt** (2024)
2. **Brianna Xi** (2024)
3. **Teddy Duncker** (2023, next: SpaceX)
4. **Miriam Kim** (2022, next: Harvard University)

#### Press Coverage

[New York Times](#): Can Intelligence Be Separated From the Body?

[Duke University](#): Engineering an Engaging Curriculum in Robotics

[New York Times](#): ‘Consciousness’ in Robots Was Once Taboo. Now It’s the Last Word.

[NSF](#): Engineers build a self-aware, self-training robot that can avoid obstacles and assess damage

[VICE/Motherboard](#): AI Is Discovering Its Own ‘Fundamental’ Physics And Scientists Are Baffled

[ScienceDaily](#): Engineering roboticists discover alternative physics

[COSMOS Magazine](#): Artificial intelligence tool swings into action, discovering alternative physics variables!

[Phys.org](#): Roboticists discover alternative physics

[Fortune](#): DeepMind uses A.I. to find the shape of every known protein

[The Sun](#): Creepy artificial intelligence spotted creating its own science that even human experts don’t understand

[Columbia Engineering](#): Columbia Engineering Roboticists Discover Alternative Physics

[Popular Science](#): A self-aware robot taught itself how to use its body

[The Sun](#): MIRROR Scientists built a ‘self-aware’ robot that can PERCEIVE itself as concern over AI sentience grows

[Yahoo News](#): This Self-Aware Robot Taught Itself How to Control Its Own Body

[Columbia Engineering](#): A Robot Learns to Imagine Itself

[Study Finds](#): Robo body image? Scientists train robot to imagine itself, become self-aware

[NewScientist](#): Robot that can perceive its body has self-awareness, claim researchers

[Inverse](#): This Experimental Robot Replicates a Distinctly Human Sense Embodiment

[ScienceDaily](#): A Robot Learns to Imagine Itself

[TechXplore](#): A Robot Learns to Imagine Itself

[ASME](#): An AI-Driven Robot Smiles Back

[Forbes](#): A Robot That Smiles: Scientists Have Created A Robot That Responds To Human Facial Expressions

[Columbia Engineering](#): The Robot Smiled Back

[Daily Mail](#): Smile like you mean it! Scientists develop an eerily human-like robot head with ...

[TechXplore](#): Researchers create robot that smiles back

[CTV News](#): This robot can mimic your facial expression by watching you

[NSF](#): Deep learning networks may prefer the human voice -- as we do

[Columbia Engineering](#): Deep Learning Networks Prefer the Human Voice—Just Like Us

[ACM](#): Deep Learning Networks Prefer the Human Voice

[Columbia Magazine](#): Self-Aware Robots? Engineers Edge Toward Elusive Goal

[Columbia Engineering](#): Robot Displays a Glimmer of Empathy to a Partner Robot

[Yale Magazine](#): Robotic Theory of Mind

[TechXplore](#): Robot Displays a Glimmer of Empathy to a Partner Robot

#### Invited Talks

**July 2024**: Text2Robot. ALIFE Conference.

**July 2024**: Robot Scientist. University of Michigan. Center for Scientific Foundation Models.

## Boyuan Chen

**April 2024:** AI and Us: The Future of Co-creation. Industry Leaders Sanford Area Growth Alliance.  
**March 2024:** General-Purpose AI for Humans, Robots, and Science. University of Utah.  
**March 2024:** Human-AI Teaming. CU Boulder.  
**December 2023:** General-Purpose AI for Humans, Robots, and Science. Columbia University.  
**December 2023:** General-Purpose AI for Humans, Robots, and Science. Amazon Robotics.  
**October 2023:** RoboNurse: Future Healthcare through General-Purpose Robots and AI. Duke Pratt Engineering & School of Nursing.  
**October 2023:** Optimizing Hospital Workflow. Duke Raleigh Hospital.  
**October 2023:** From Narrow Robots to General Robots. Duke Alumni Event.  
**October 2023:** General-Purpose AI for Humans, Robots, and Science. Duke Medical Robotics Symposium.  
**August 2023:** Generative AI for Human-AI Teaming, Duke University. Army Research Lab.  
**July 2023:** General-Purpose AI for Humans, Robots, and Science. NIH.  
**June 2023:** General-Purpose Human-AI Teaming Framework. Stanford University.  
**May 2023:** General-Purpose Human-AI Teaming Framework. UCSD.  
**May 2023:** From Narrow Robots to General Robots. DEVCOM / C5ISR.  
**April 2023:** From Narrow Robots to General Robots. BMW.  
**April 2023:** From Narrow Robots to General Robots. Columbia University.  
**April 2023:** From Narrow Robots to General Robots. Duke Brain Institute.  
**March 2023:** From Narrow Robots to General Robots. Duke DMI Outreach.  
**Oct. 2022:** From Narrow Robots to General Robots. The Martlets Society.  
**Oct. 2022:** Discovering State Variables Hidden in Experimental Data. University of Tennessee joint seminar Math and Applied Math departments.  
**Oct. 2022:** From Narrow Robots to General Robots. Ethics of Translational Research at Duke University.  
**Sept. 2022:** From Narrow Robots to General Robots. Duke CS Department.  
**Aug. 2022:** Self-Modeling of Robot Morphologies. IEEE Soft Robotics Podcast.  
**Aug. 2022:** AI for Scientific Discovery: A Journey. Duke aiM Program Bootcamp.  
**July 2022:** Discovering State Variables Hidden in Experimental Data. SIAM Annual Meeting Mini-symposium.  
**July 2022:** Towards Generalist Robots Through World Modeling. Fast Movements Symposium.  
**March. 2022:** From Narrow Robots to General Robots. Duke MEMS department.  
**Feb. 2022:** From Narrow Robots to General Robots. NVIDIA Robotics.  
**Jan. 2022:** From Narrow Robots to General Robots. University of Wisconsin-Madison.  
**Oct. 2021:** Learning the Embodied Self, Others and Beyond. Columbia University.  
**June 2021:** The Boombox: Visual Reconstruction from Acoustic Vibrations. CVPR.  
**May 2021:** Visual Perspective Taking for Opponent Behavior Modeling. ICRA.  
**May 2021:** Smile Like You Mean It: Driving Animatronic Robotic Face with Learned Models. ICRA.  
**Aug. 2020:** Robot Theory of Mind. Columbia Robotics Seminar.  
**July 2020:** Visual Hide and Seek. ALife.  
**Jan. 2020:** Robot Theory of Mind. Jilin University.  
**April 2019:** Robot Theory of Mind. Columbia University.  
**July 2018:** Autostacker: A Compositional Evolutionary Learning System. GECCO.  
**April 2018:** Robotics and Reinforcement Learning. Columbia University.

## Academic Services

### Reviewer:

**Robotics:** Science Robotics, ICRA, IROS, CoRL, RA-L, npj Robotics

**Vision:** CVPR, ICCV, TPAMI, WACV

**Learning:** ICML, NeurIPS, ICLR, GECCO, ALIFE

**AI4Science:** Nature Computational Science

**Founder and Organizer:** Duke Robotics Seminar Series (founder and organizer)

### Grants

Total share by my lab since July 2022: **\$8,005,584**. Total share by my lab as Lead-PI: **\$5,946,172**

1. PI, ARL, \$600,000, 10/24-09/27
2. Co-PI, NSF, \$112,097, 06/24-08/25
3. PI, ARL, \$100,000, 09/24-08/25
4. PI, Duke, School of Nursing & Pratt School of Engineering, \$75,000, 08/24-02/26
5. PI, CMI2&ARL, \$1,500,000, 08/24-02/26
6. PI, Duke, Thomas Lord Educational Innovation Award, \$32,300, 07/24-06/25
7. Co-I, NIH, \$17,873, 07/25-06/27
8. Co-I, NIH, \$17,873, 07/25-06/27
9. PI, ARL, \$750,000 (out of \$1,500,000), 08/24-07/27
10. PI, DARPA, \$1,323,622, 07/24-06/27
11. PI, DARPA, \$965,250, 01/24-07/25
12. PI, ARL, \$100,000, 09/23-08/24
13. PI, CMI2&ARL, \$500,000, 09/2023-02/2024
14. Co-PI, ARL, \$1,864,000 (out of \$2,744,220), 08/23-07/26
15. Co-PI, ARL, \$47,569 (out of \$99,440), 08/22-07/23