# Benjamin Eisner

*Curriculum Vitae*

---

CONTACT
INFORMATION

Carnegie Mellon University
Pittsburgh, PA 15232

*Email:* baeisner@andrew.cmu.edu
*Site:* www.beisner.me

RESEARCH
INTERESTS

Learning for manipulation, 3D perception, deep reinforcement learning

EDUCATION

**Carnegie Mellon University**, Pittsburgh, Pennsylvania USA      **August 2020 -**

Ph.D. in Robotics, Robotics Institute - School of Computer Science

Advisor: David Held

Coursework: *Intermediate Stats (36-705), Computer Vision (16-720), Kinematics & Dynamics (16-711), Deep RL for Robotics (16-881), Advanced ML (10-715/10-716), 3D Learning (16-889)*

**Princeton University**, Princeton, New Jersey USA      **Sept. 2013 - Jun. 2017**

Bachelor of Science in Engineering, Computer Science
High Honors | GPA: 3.51 | Departmental GPA: 3.64

**University College London**, London UK      **Jan. 2016 - Jun. 2016**

Affiliate Student in Computer Science

EXPERIENCE

**Tesla**, Palo Alto, CA      **June 2024 - Sept 2024**
*ML/Robotics Intern - Optimus*

Manager: Julian Ibarz

- Worked on a high-velocity, cross-functional ML team building Optimus's brain.
- Specialized in deep learning models for visual intelligence.

**DeepMind**, London, UK      **July 2022 - Nov. 2022**
*Research Scientist Intern - Visual Learning for Manipulation*

Collaborators: Jon Scholz, Yi Yang, Todor Davchev, Mel Vecerik

- Researched ways to incorporate 3D visual inductive biases into large-scale robot learning systems.
- Developed a provably SE(3)-Equivariant architecutre for learning relative object placement tasks from demonstrations, resulting in a publication at ICLR 2024.

**Samsung AI Center**, New York, New York USA      **Nov. 2018 - Aug. 2020**
*Machine Learning Research Engineer*

Advisors: Daniel Lee, Sebastian Seung, Larry Jackel

- Developed novel deep reinforcement learning algorithms for exploration in sparse environments and improved training stability, leading to a conference paper (IJCAI-PRICAI 2020) and a workshop paper (ICML 2019).
- Collaborated on a project that fused traditional planning with deep learning to learn diverse manipulation behaviors, resulting two publications (including IROS 2019).

**Google**, New York, New York USA — **Sept. 2017 - Nov. 2018**

*Software Engineer (L3 & L4) - Geo Data*

- Led an organization-wide effort to test how massive data changes affected the Google Maps API.
- Developed a workflow management system for simulating world-scale launches for Google Maps and Knowledge Graph.
- Consistently managed tens of simultaneous experiments that processed petabytes of data across thousands of nodes, enabling major org-wide launches.

**Princeton University**, Princeton, New Jersey USA — **Jan. 2015 - May 2017**

*Lab Teaching Assistant*

**Machine Reading Lab @ UCL**, London UK — **Jan. 2016 - Nov. 2016**

*Research Intern*

Advisors: Sebastian Riedel, Tim Rocktaschel

- Researched ways to learn embeddings for new tokens based only on short, natural language descriptions, leading to a workshop publication at EMNLP 2016.
- Demonstrated quantitative improvements on downstream NLP tasks (i.e. Twitter Sentiment Classification) using learned Emoji embeddings.

**Google**, Kirkland, Washington USA — **Jun. 2016 - Sept. 2016**

*Software Engineering Intern*

**Microsoft**, Redmond, Washington USA — **Jun. 2015 - Sept. 2015**

*Software Engineering Intern*

**Contactive**, New York, New York USA — **Jun. 2014 - Dec. 2014**

*Software Engineering Intern*

**Konica Minolta Medical Imaging**, Wayne, New Jersey USA — **Jul. 2013 - Aug. 2013**

*Software Development Intern*

Honors and Awards

| | |
|---|---|
| Best Paper Finalist, RSS 2022 | 2022 |
| **NSF Graduate Research Fellowship** | **2020 - present** |
| High Honors, Department of Computer Science, Princeton University | 2017 |
| Elected to Sigma Xi | 2017 |
| Best Paper, SocialNLP Workshop at EMNLP 2016 | 2016 |
| National Merit Scholar | 2013 |

Publications

**2024**

Cai, E., Donca, O., **Eisner, B.**, Held, D. (2024). Non-rigid Relative Placement through 3D Dense Diffusion. **CoRL 2024**. `https://openreview.net/forum?id=rvKWXxIvj0`

Li, Y., Leng, W., Fang, Y., **Eisner, B.**, Held, D. (2024). FlowBotHD: History-Aware Diffuser Handling Ambiguities in Articulated Objects Manipulation. **CoRL 2024**. `https://openreview.net/forum?id=3ZAgXBRvla`

**Eisner, B.**, Yang, Y., Davchev, T., Vecerik, M., Scholz, J., & Held, D. (2024). Deep SE(3)-Equivariant Geometric Reasoning for Precise Placement Tasks. **ICLR 2024**. `https://openreview.net/forum?id=2inBuwTyL2`

**2023**

Zhang, H., **Eisner, B.**, Held, D. (2023). FlowBot++: Learning Generalized Articulated Objects Manipulation via Articulation Projection. **CoRL 2023**. `https://sites.google.com/view/flowbotpp/home`

Qureshi, M. N., **Eisner, B.**, Held, D. (2023). On Time-Indexing as Inductive Bias in Deep RL for Sequential Manipulation Tasks. **LmMbMG Workshop @ IROS 2023** .

**2022**

Pan, C.*, Okorn, B.*, Zhang, H.*, **Eisner, B.***, Held, D. (2022). TAX-Pose: Task-Specific Cross-Pose Estimation for Robot Manipulation. **CoRL 2022**. `https://sites.google.com/view/tax-pose/home`

**Eisner, B.***, Zhang, H.*, Held, D. (2022). FlowBot3D: Learning 3D Articulation Flow to Manipulate Articulated Objects. **Best Paper Finalist, RSS 2022**. `https://sites.google.com/view/articulated-flowbot-3d`

Qureshi, M. N., **Eisner, B.**, Held, D. (2022). Deep Sequenced Linear Dynamical Systems for Manipulation Policy Learning. **NeurIPS 2022 Workshop**. `https://sites.google.com/view/deep-sequenced-lds`

Narasimhan, G., Zhang, K., **Eisner, B.**, Lin, X., & Held, D. (2022) Self-supervised Transparent Liquid Segmentation for Robotic Pouring. **ICRA 2022**. `https://sites.google.com/view/transparentliquidpouring`

**2021**

Yang, D., Tosun, T., **Eisner, B.**, Isler, V., & Lee, D. (2021). Robotic Grasping through Combined image-Based Grasp Proposal and 3D Reconstruction. **ICRA 2021**. `https://arxiv.org/abs/2003.01649`

**2020**

Simmons-Edler, R., **Eisner, B.**, Yang, D., Bisulco, A., Mitchell, E., Seung, S., & Lee, D. (2020). Reward Prediction Error as an Exploration Objective in Deep RL. **International Joint Conference on Artificial Intelligence 2020 (IJCAI-PRICAI2020)**. `https://arxiv.org/abs/1906.08189`

**2019**

Tosun, T., Mitchell, E., **Eisner, B.**, Huh, J., Lee, B., Lee, D., ... & Lee, D. (2019). Pixels to Plans: Learning Non-Prehensile Manipulation by Imitating a Planner. **IROS 2019**. `https://arxiv.org/abs/1904.03260`

Simmons-Edler, R.*, **Eisner, B.***, Mitchell, E.*, Seung, S., & Lee, D. (2019). Q-Learning for Continuous Actions with Cross-Entropy Guided Policies. **RL4RealLife Workshop, ICML 2019**. `https://arxiv.org/abs/1903.10605`

### 2016

**Eisner, B.**, Rocktäschel, T., Augenstein, I., Bošnjak, M., & Riedel, S. (2016). emoji2vec: Learning emoji representations from their description. **Best Paper, SocialNLP Workshop, EMNLP 2016**. `https://arxiv.org/abs/1609.08359`

| | | |
|---|---|---|
| PRESENTATIONS | FlowBot3D: Learning 3D Articulation Flow to Manipulate Articulated Objects<br>*Long Oral, Best Paper Finalist, RSS 2022* | 2022 |
| | Mapping Your Brain with Deep Learning<br>*Internal talk at Google NYC* | 2017 |
| | emoji2vec: Learning emoji representations from their description.<br>*SocialNLP Workshop at EMNLP 2016* | 2016 |