

Nicholas Rhinehart

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Last modified: 2022/05/09

Current Position

University of California, Berkeley Postdoctoral Scholar, EECS Department, Berkeley A.I. Research (BAIR) Adviser: Sergey Levine	Oct 2019 – Present
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Education

Carnegie Mellon University , The Robotics Institute of the School of Computer Science Doctor of Philosophy in Robotics Adviser: Kris Kitani	Aug 2014 – Sep 2019
Carnegie Mellon University , The Robotics Institute of the School of Computer Science Master of Science in Robotics Adviser: Drew Bagnell	Jan 2013 – Aug 2014
Swarthmore College Bachelor of Arts in Computer Science, Bachelor of Science in Engineering	Aug 2008 – May 2012

Professional Experience

University of California, Berkeley , EECS Department, Berkeley A.I. Research (BAIR) Postdoctoral Scholar with Sergey Levine	Oct 2019 – Present
University of California, Berkeley , EECS Department, Berkeley A.I. Research (BAIR) Visiting Researcher with Sergey Levine	Jun 2018 – Nov 2018
NEC Labs America , Media Analytics Department Research Assistant with Paul Vernaza	May 2017 – Sep 2017
Uber Advanced Technologies Group Research Engineer with Drew Bagnell	Jun 2016 – Sep 2016
University of Tokyo , Institute of Industrial Science Visiting Researcher with Kris Kitani	Jun 2015 – July 2015
Carnegie Mellon University , The Robotics Institute of the School of Computer Science Doctoral Student Researcher with Kris Kitani	Aug 2014 – Sep 2019
Carnegie Mellon University , The Robotics Institute of the School of Computer Science Master's Student Researcher with Drew Bagnell	Jan 2013 – Aug 2014

Academic Awards

PAPER AWARDS

Best Paper Award, ICML 2019 Workshop on AI for Autonomous Driving For the paper: PRECOG (Rhinehart et al.)	2019
Best Paper Award Honorable Mention, ICCV 2017 For the paper: First-Person Activity Forecasting (Rhinehart et al.) . Awarded to 3 of 2,143 submissions.	2017

FELLOWSHIP AWARDS

PhD Fellowship, Center for Machine Learning and Health

2018

Awarded full tuition and funds for *Automatic Forecasting and Understanding of Behavior* research proposal

IBM PhD Fellowship Finalist

2017

Nominated as one of three CMU Robotics Institute candidates for the IBM PhD Fellowship

The Robert E., Elizabeth, and Walter Lamb Scholarship, Swarthmore College

2011, 2012

Awarded scholarships on the bases of academic merit and financial need.

PROFESSIONAL SERVICE AWARDS

Top Reviewer Award (x4)

2019, 2019, 2021, 2021

NeurIPS 2021 · ICML 2021 · NeurIPS 2019 · ICCV 2019

Recognized for contributions to the reviewing process.

Funding Awards

Toyota Research Institute, Co-Investigator.

2021–2024

\$1,125,000 to study “Unified Predictive Representations for Multi-agent Modeling, Tracking, Forecasting, and Control”.

Fellowship, CMU Center for Machine Learning and Health.

2019

\$85,000 (tuition, stipend, and discretionary funds) to study “Automatic Forecasting and Understanding of Behavior”.

Travel Grant (x5): NeurIPS (x2), CMU Provost (x2), ICRA

{2018, 2015}, {2017, 2016}, 2017

Financial conference travel support.

Hardware Grant: NVIDIA

2014

Granted GPU.

Publications

CONFERENCE AND JOURNAL PUBLICATIONS

- [1] [Hybrid Imitative Planning with Geometric and Predictive Costs in Off-road Environments](#)
N. Dashora*, D. Shin*, D. Shah, H. Leopold, D. Fan, A. Agha-Mohammadi, **N. Rhinehart**, S. Levine.
International Conference on Robotics Automation (**ICRA**), 2022.
- [2] [Information is Power: Intrinsic Control via Information Capture](#)
N. Rhinehart, J. Wang, G. Berseth, JD Co-Reyes, D. Hafner, C. Finn, S. Levine
Neural Information Processing Systems (**NeurIPS**), 2021.
- [3] [RECON: Rapid Exploration for Open-World Navigation with Latent Goal Models](#)
D. Shah, B. Eysenbach, **N. Rhinehart**, S. Levine
Oral Presentation, Conference on Robot Learning (**CoRL**), 2021.
- [4] [Contingencies from Observations: Tractable Contingency Planning with Learned Behavior Models](#)
N. Rhinehart*, J. He*, C. Packer, M. A. Wright, R. McAllister, J. E. Gonzalez, S. Levine
International Conference on Robotics and Automation (**ICRA**), 2021.
- [5] [ViNG: Learning Open-World Navigation with Visual Goals](#)
D. Shah, B. Eysenbach, G. Kahn, **N. Rhinehart**, S. Levine
International Conference on Robotics and Automation (**ICRA**), 2021.
- [6] [Parrot: Data-Driven Behavioral Priors for Reinforcement Learning](#)
A. Singh*, H. Liu*, G. Zhou, A. Yu, **N. Rhinehart**, S. Levine
Oral Presentation, International Conference on Learning Representations (**ICLR**), 2021.

- [7] SMiRL: Surprise Minimizing RL in Dynamic Environments
G. Berseth, D. Geng, C. Devin, **N. Rhinehart**, C. Finn, D. Jayaraman, S. Levine
Oral Presentation, International Conference on Learning Representations (**ICLR**), 2021.
- [8] Conservative Safety Critics for Exploration
H. Bharadhwaj, A. Kumar, **N. Rhinehart**, S. Levine, F. Shkurti, A. Garg
International Conference on Learning Representations (**ICLR**), 2021.
- [9] Inverting the Forecasting Pipeline with SPF2: Sequential Pointcloud Forecasting for Sequential Pose Forecasting
X. Weng, J. Wang, S. Levine, K. Kitani, **N. Rhinehart**
Conference on Robot Learning (**CoRL**), 2020.
- [10] Can Autonomous Vehicles Identify, Recover From, and Adapt to Distribution Shifts?
A. Filos*, P. Tigas*, R. McAllister, **N. Rhinehart**, S. Levine, Y. Gal
International Conference of Machine Learning (**ICML**), 2020.
- [11] Generative Hybrid Representations for Activity Forecasting with No-Regret Learning
J. Guan, Y. Yuan, K. M. Kitani, **N. Rhinehart**
Oral Presentation, Computer Vision and Pattern Recognition (**CVPR**), 2020.
- [12] Deep Imitative Models for Flexible Inference, Planning, and Control
N. Rhinehart, R. McAllister, S. Levine
International Conference on Learning Representations (**ICLR**), 2020.
- [13] PRECOG: PREdiction Conditioned On Goals in Visual Multi-Agent Settings
N. Rhinehart, R. McAllister, K. M. Kitani, S. Levine
IEEE International Conference on Computer Vision (**ICCV**), 2019.
- [14] Directed-Info GAIL: Learning Hierarchical Policies from Unsegmented Demonstrations using Directed Information
M. Sharma, A. Sharma, **N. Rhinehart**, K. M. Kitani
International Conference on Learning Representations (**ICLR**), 2019.
- [15] First-Person Activity Forecasting from Video with Online Inverse Reinforcement Learning
N. Rhinehart, K. M. Kitani.
IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2018.
- [16] R2P2: A Reparameterized Pushforward Policy for Diverse, Precise Generative Path Forecasting
N. Rhinehart, K. M. Kitani, P. Vernaza
European Conference on Computer Vision (**ECCV**), 2018.
- [17] Learning Neural Parsers with Deterministic Differentiable Imitation Learning
T. Shankar, **N. Rhinehart**, K. Muelling, K. M. Kitani
Conference on Robot Learning (**CoRL**), 2018.
- [18] Human-Interactive Subgoal Supervision for Efficient Inverse Reinforcement Learning
X. Pan, E. Ohn-Bar, **N. Rhinehart**, Y. Xu, Y. Shen, K. M. Kitani
International Conference on Autonomous Agents and Multiagent Systems (**AAMAS**), 2018.
- [19] N2N Learning: Network to Network Compression via Policy Gradient Reinforcement Learning
A. Ashok, **N. Rhinehart**, F. Beainy, K. M. Kitani
International Conference on Learning Representations (**ICLR**), 2018.
- [20] Predictive-State Decoders: Encoding the Future into Recurrent Networks
A. Venkatraman*, **N. Rhinehart***, W. Sun, L. Pinto, M. Hebert, B. Boots, K. M. Kitani, J. A. Bagnell
Neural Information Processing Systems (**NeurIPS**), 2017.

- [21] [First-Person Activity Forecasting with Online Inverse Reinforcement Learning](#)
N. Rhinehart, K. M. Kitani.
Oral Presentation, IEEE International Conference on Computer Vision (**ICCV**), 2017.
Best Paper Award Honorable Mention. Awarded to 3 of 2,143 submissions
- [22] [Learning Action Maps of Large Environments via First-Person Vision](#)
N. Rhinehart, K. M. Kitani
Computer Vision and Pattern Recognition (**CVPR**), 2016.
- [23] [Visual Chunking: A List Prediction Framework for Region-Based Object Detection](#)
N. Rhinehart, J. Zhou, M. Hebert, J. A. Bagnell
International Conference on Robotics and Automation (**ICRA**), 2015.

PRE-PRINTS

- [24] [Explore and Control with Adversarial Surprise](#)
A. Fickinger*, N. Jaques*, S. Parajuli, M. Chang, **N. Rhinehart**, G. Berseth, S. Russell, S. Levine
arXiv, 2021.

PATENTS

- [25] [Generative Adversarial Inverse Trajectory Optimization for Probabilistic Vehicle Forecasting](#)
P. Vernaza, W. Choi, **N. Rhinehart**
US20190095731A1, Pending, 2019.
- [26] [Traffic prediction with reparameterized pushforward policy for autonomous vehicles](#)
P. Vernaza, **N. Rhinehart**
US20190287404A1, Pending, 2019.
- [27] [Balancing diversity and precision of generative models with complementary density estimators](#)
P. Vernaza, **N. Rhinehart**, A. Liu, Kihyuk Sohn
US20190355134A1, Pending, 2019.

Academic and Professional Talks

INVITED WORKSHOP TALKS

IROS 2022, Behavior-driven Autonomous Driving in Unstructured Environments, Kyoto, Japan, October 2022
ICRA 2021, Long-term Human Motion Prediction, Xi'an, China [Remote], Jun 2021
CVPR 2020, Precognition: Seeing through the Future, Seattle, Washington [Remote], Jun 2020
ICCV 2019, Workshop on Autonomous Driving - Beyond Single Frame Prediction, Seoul, South Korea, Oct 2019
ACCV 2018, Attention/Intention Understanding Workshop, Perth, Australia, Dec 2018

INVITED TUTORIAL TALKS

CVPR 2018, Tutorial on Inverse RL for Computer Vision, Organizer and Speaker, Salt Lake City, Utah, Jun 2018
CVPR 2018, Tutorial on Human Activity Forecasting, Salt Lake City, Utah Jun 2018

CONTRIBUTED CONFERENCE TALKS

ICLR 2021, Oral Paper Presentation of SMiRL (non-speaking), Vienna, Austria [Remote] May 2021
ICLR 2021, Oral Paper Presentation PARROT (non-speaking), Vienna, Austria [Remote] May 2021
CVPR 2020, Oral Paper Presentation (Last author, non-speaking), Seattle, Washington [Remote] Jun 2020
Baylearn 2019, Single-Track Oral Paper Presentation, San Francisco, California Oct 2019
ICCV 2017, Single-Track Oral Paper Presentation, Venice, Italy Oct 2017

CONTRIBUTED WORKSHOP TALKS

NeurIPS 2018 , Infer2Control: Probabilistic RL and Structured Control Workshop , Montreal, Canada	Dec 2018
NeurIPS 2018 , ML for Intelligent Transportation Systems Workshop , Montreal, Canada	Dec 2018
MACV 2016 , Mid-Atlantic Computer Vision Workshop , Baltimore, Maryland	May 2016

PANELS

ICCV 2019 , Workshop on Autonomous Driving - Beyond Single Frame Prediction , Seoul, South Korea	Oct 2019
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INVITED UNIVERSITY TALKS

McGill University, Department of Electrical Engineering , Digital	March 2022
Stanford University, Stanford Vision and Learning Lab , Digital	Jan 2022
U.C. Berkeley, Berkeley Artificial Intelligence Research Lab Seminar , Berkeley, California	Jan 2022
Applied RL Seminar , Digital	Dec 2020
U.C. Berkeley, Berkeley Deep Drive Group , Berkeley, California	Aug 2018
U.C. Berkeley, RAIL Lab , Berkeley, California	Jun 2018
NEC Labs America , Cupertino, California	Jun 2017
The University of Tokyo IIS, Sato Laboratory , Tokyo, Japan	Jun 2015
CMU , Misc-Read Vision Group, Pittsburgh, PA	Nov 2015

INVITED INDUSTRY TALKS

Uber ATG , Toronto, Canada [Remote]	Oct 2020
Scale AI , San Francisco, California	Oct 2019
Tesla , Palo Alto, California	Oct 2019
Argo AI , Pittsburgh, Pennsylvania	Jul 2019
iSee , Pittsburgh, Pennsylvania	May 2019
Zoox , San Francisco, California	Jan 2019
Google Waymo , Mountain View, California	Nov 2018

GUEST LECTURES

CMU , Guest Lecture in Statistical Techniques of Robotics, Pittsburgh, Pennsylvania	May 2019
CMU , Guest Lecture in Deep RL and Control (10-703), Pittsburgh, Pennsylvania	Nov 2018
CMU , Introduction to Computer Vision, Guest Lecture, Pittsburgh, Pennsylvania	Apr 2018
CMU , Graduate Statistical Techniques in Robotics, Guest Lecture, Pittsburgh, Pennsylvania	Apr 2018
CMU , Graduate Statistical Techniques in Robotics, Guest Lecture, Pittsburgh, Pennsylvania	Sep 2017

Academic Activity & Service

TEACHING

Teaching Assistance

Geometry-based Methods in Vision (16-822), CMU.	Fall 2016
Data Structures and Algorithms (CPSC 035), Swarthmore College.	Fall 2011
Data Structures and Algorithms (CPSC 035), Swarthmore College.	Spring 2011
Introduction to Computer Science (CPSC 021), Swarthmore College.	Spring 2010

Tutoring

Fundamentals of Digital Systems (ENGR 015, CS 038), Swarthmore College	Fall 2011
Grade 6–12 Mathematics and Physics	Spring 2009 – Spring 2012

RESEARCH MENTORING

Graduate students

Charles Packer (UC Berkeley PhD student). Co-authored ICRA '21 paper with Charles.	2020–
Dhruv Shah (UC Berkeley PhD student). Co-authored ICRA '21 paper and CoRL '21 paper with Dhruv.	2020–
Angelos Filos (Oxford PhD student). Co-authored ICML '20 paper with Angelos.	2019–
Panos Tigas (Oxford PhD student). Co-authored ICML '20 paper with Panos.	2019–
Xinshuo Weng (CMU RI PhD student). Last-authored CoRL '20 paper; co-authored CVPR '22 submission with Xinshuo.	2019–
Tanmay Shankar (CMU MS RI, now at FAIR). Co-authored CORL '18 paper with Tanmay.	2018
Arjun Sharma (CMU MS RI, now at Vicarious). Co-authored ICLR '19 paper with Arjun.	2018
Mohit Sharma (CMU MS RI, now PhD at CMU). Co-authored ICLR '19 paper with Mohit.	2018
Anubhav Ashok (CMU MS CV, now at Niantic). Co-authored ICLR '18 paper with Anubhav.	2017
Xinlei Pan (UC Berkeley PhD EECS visitor). Co-authored AAMAS '18 paper with Xinlei.	2017

Undergraduate students

Daniel Shin (UC Berkeley undergrad). Co-authored ICRA '22 submission with Daniel.	2021–
Nitish Dashora (UC Berkeley undergrad). Co-authored ICRA '22 submission with Nitish.	2020–
Jeff He (UC Berkeley undergrad). Co-authored ICRA '21 paper with Jeff.	2020–
Jenny Wang (UC Berkeley undergrad). Co-authored NeurIPS '21 paper with Jenny.	2020–
Huihan Liu (UC Berkeley undergrad, now PhD at UT Austin). Co-authored ICLR '21 paper with Huihan.	2020 – 2021
Jiaqi Guan (Tsinghua University visitor, now PhD at UIUC). Last-authored CVPR '20 paper (Oral) with Jiaqi.	2018 – 2019

PROFESSIONAL SERVICE

Organizer

NeurIPS '21 Workshop on Machine Learning for Autonomous Driving	2021
NeurIPS '20 Workshop on Machine Learning for Autonomous Driving	2020
NeurIPS '19 Workshop on Machine Learning for Autonomous Driving	2019
ICML '19 Workshop on Imitation, Intent, and Interaction (I3)	2019
CVPR '18 Tutorial on Inverse RL for Computer Vision [recording has >5,000 views]	2018

Conference and Journal Reviewing

CoRL '21, CVPR '21, ICCV '21, ICLR '21, ICML '21, ICRA '21, NeurIPS '21, RA-L '21	2021
CoRL '20, ICLR '20, ICML '20, ICRA '20, ECCV '20, HRI '20, JAIR '20, NeurIPS '20, TPAMI '20	2020
BMVC '19, CVPR '19, ICML '19, ICCV '19, ICRA '19, NeurIPS '19, TPAMI '19, IJCV '19	2019
CVPR '18, ECCV '18, IJCV '18, IJRR '18, IROS '18	2018
CVPR '17, ICCV '17	2017
CVPR '16	2016

Workshop Reviewing

CVPR '20 Precognition: Seeing through the Future	2020
ICML '19 Exploration in RL, CVPR '19 Precognition: Seeing through the Future, ICCV '19 EPIC	2019
NeurIPS '18 Deep Reinforcement Learning, NeurIPS '18 Imitation Learning and Robotics	2018
ECCV '18 EPIC, ECCV '18 Anticipating Human Behaviors	2018
ICML '18 Exploration in RL, ACCV '18 Attention/Intention Understanding, ACM IUI SymCollab '18	2018
WACV '17 Human Activity Analysis, CVPR '16 Egocentric Behavior	2016 – 2017

UNIVERSITY SERVICE

BAIR Undergraduate Mentoring , UC Berkeley	2020
Mentored undergraduates from underrepresented groups to foster participation in AI research	
Ph.D. Admissions Committee , CMU Robotics Institute	2017
Evaluated Ph.D. applications as part of small committee	

M.S. Admissions Committee , CMU Robotics Institute Evaluated M.S. applications as part of small committee	2015, 2016
Robotics Institute Representative , CMU Graduate Student Association Represented and liaised between Robotics graduate students and the Graduate Student Assembly	2015 – 2017
Co-Chair , Swarthmore Philanthropy Council Assist in coordinating alumni fundraising efforts	2011 – 2012
Class Treasurer , Swarthmore College Manage the collective finances of the Class of 2012	2011 – Present

THESIS COMMITTEES

M.S. Robotics, CMU

Tanmay Shankar, Learning Neural Parsers with Deterministic Differentiable Imitation Learning	2018
Arjun Sharma, Integrating Structure with Deep Reinforcement and Imitation Learning	2018
Mohit Sharma, Inverse Reinforcement Learning with Conditional Choice Probabilities	2018

References

Sergey Levine

Associate Professor, Electrical Engineering and Computer Science
University of California, Berkeley
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Kris Kitani

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Carnegie Mellon University
kkitani@cs.cmu.edu

Joseph E. Gonzalez

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University of California, Berkeley
jegonzal@cs.berkeley.edu