ROBERTA RAILEANU

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RESEARCH INTERESTS

Reinforcement Learning, Self-Supervised Learning, Generalization, Few-Shot Learning

CURRENT POSITION

Fundamental AI Research (FAIR - Meta), London, UK Oct 2021 - Present

EDUCATION

New York University, NY, USA Sep 2016 - Sep 2021
PhD in Computer Science
Thesis: Towards More General and Adaptive Reinforcement Learning Agents
Advisor: Rob Fergus

Princeton University, NJ, USA Sep 2012 - June 2016
A.B. in Astrophysical Sciences, *magna cum laude*
Certificates (Minors): Statistics and Machine Learning, Applications of Computing
Thesis: Clustering Redshift Estimation for the Hyper Suprime-Cam Survey
Advisor: Michael Strauss

PUBLICATIONS

Jiang Y, Kolter Z, **Raileanu R**, Uncertainty-Driven Exploration for Generalization in Reinforcement Learning, *under review*, 2022.

Gaya JB, Doan T, Caccia L, Soulier L, Denoyer L, **Raileanu R**, Building a Subspace of Policies for Scalable Continual Learning, *under review*, 2022.

Samvelyan M, Khan A, Dennis M, Jiang M, Parker-Holder J, Foerster J, **Raileanu R**, Rocktäschel T, MAESTRO: Open-Ended Environment Design for Multi-Agent Reinforcement Learning, *under review*, 2022.

Henaff M, Jiang M, **Raileanu R**, Integrating Episodic and Global Novelty Bonuses for Efficient Exploration, *under review*, 2022.

Henaff M, **Raileanu R**, Jiang M, Rocktäschel T, Exploration via Elliptical Episodic Bonuses, *NeurIPS*, 2022.

Mu J, Zhong V, **Raileanu R**, Jiang M, Goodman N, Rocktäschel T, Grefenstette E, Improving Intrinsic Exploration with Language Abstractions, *NeurIPS*, 2022.

Hambro E, **Raileanu R**, Rothermel D, Mella V, Rocktäschel T, Kuttler H, Murray N, Dungeons and Data: A Large-Scale NetHack Dataset, *NeurIPS*, 2022.

Open Ended Learning Team, Stooke A, Mahajan A, Barros C, Deck D, Bauer J, Sygnowski J, Trebacz M, Jaderberg M, Mathieu M, McAleese N, Bradley-Schmieg N, Wong N, Porcel N, **Raileanu R**, Hughes-Fitt S, Dalibard V, Czarnecki W, Open-Ended Learning Leads to Generally Capable Agents, *arXiv*, 2021.

Raileanu R, Fergus R, Decoupling Value and Policy for Generalization in Reinforcement Learning, *ICML*, 2021 (**oral**).

Raileanu R, Goldstein M, Yarats D, Kostrikov I, Fergus R, Automatic Data Augmentation for Generalization in Deep Reinforcement Learning, *NeurIPS*, 2021 and *Inductive Biases, Invariances, and Generalization in Reinforcement Learning Workshop*, *ICML*, 2020 (**oral**).

Campero A, **Raileanu R**, Heinrich K, Tenenbaum J, Rocktäschel T, Grefenstette E, Learning with AMIGo: Adversarially Motivated Intrinsic Goals, *ICLR*, 2021.

Raileanu R, Goldstein M, Szlam A, Fergus R, Fast Adaptation to New Environments via Policy-Dynamics Value Functions, *ICML* 2020 and *Beyond "Tabula Rasa" in Reinforcement Learning Workshop*, *ICLR*, 2020 (**oral**).

Raileanu R, Rocktäschel T, RIDE: Rewarding Impact-Driven Exploration for Procedurally-Generated Environments, *ICLR*, 2020.

Heinrich K, Nardelli N, Miller A, **Raileanu R**, Selvatici M, Grefenstette E, Rocktäschel T, The NetHack Learning Environment, *NeurIPS*, 2020.

Resnick C*, **Raileanu R***, Kapoor S, Peysakhovich A, Cho K, Bruna J, Backplay: "Man Muss Immer Umkehren", *Reinforcement Learning in Games Workshop*, *AAAI*, 2019.

Raileanu R, Denton E, Szlam A, Fergus R, Modeling Others using Oneself in Multi-Agent Reinforcement Learning, *ICML*, 2018.

Raileanu R, Szlam A, Fergus R, Modeling Other Agents' Hidden States in Deep Reinforcement Learning, *Emergent Communication Workshop*, *NeurIPS*, 2017.

Kim CK, Ostriker EC, **Raileanu R**, Superbubbles in the Multiphase ISM and the Loading of Galactic Winds, *The Astrophysical Journal*, 2016.

RESEARCH EXPERIENCE

DeepMind, London, UK Jan 2021 - Jun 2021
Research Intern

Researched unsupervised environment design methods for generalization in 3D environments.
Advisor: Max Jaderberg

Facebook AI Research, London, UK June - Sep 2019
Research Intern

Developed a new algorithm for exploration in sparse reward procedurally-generated environments.
Advisor: Tim Rocktäschel

Microsoft Research, Cambridge, UK June - Aug 2018
Research Intern

Researched methods for zero-shot and few-shot generalization in multi-agent settings.
Advisors: Katja Hofmann, Sam Devlin

Facebook AI Research, New York, USA June - Aug 2017
Research Intern

Researched methods for modeling other agents in semi-cooperative reinforcement learning settings.
Advisor: Arthur Szlam

Princeton University, Princeton, USA June - Aug 2015
Undergraduate Researcher

Developed 3D hydrodynamical simulations of supernovae in the multiphase interstellar medium.
Advisors: Eve Ostriker, Chang-Goo Kim

Princeton University, Princeton, USA Feb - May 2015
Undergraduate Researcher

Implemented and evaluated machine learning techniques for the prediction of stellar rotation periods.
Advisor: Timothy Morton

ETH, Zürich, Switzerland Jun - Aug 2014
Research Intern

Created Monte Carlo simulations for exoplanet detection with the James Webb Space Telescope.
Advisor: Michael Meyer

Max Planck for Extraterrestrial Physics, Garching, Germany Jun - Aug 2013
Research Intern

Developed N-Body simulations and theoretical models of the Milky Way Galaxy.
Advisor: Ortwin Gerhard

HONORS & AWARDS

Rising Stars in EECS	2020
Sigma Xi: Scientific Research Honor Society	2016
Bell Burnell Award for Early Career Female Physicist	2013
Bronze Medal at the International Physics Olympiad	2012
Silver Medal at the International Physics Olympiad	2011
Gold Medal at the International Astrophysics Olympiad	2011
Silver Medal at Tuymaada International Olympiad in Physics	2010

INVITED TALKS

Neural MMO Open-Endedness Panel	Oct 2022
AI and Games Summer School	Aug 2022
Imperial ICARL Seminar	May 2022
Microsoft Research Summit	Aug 2021
Princeton Intelligent Robot Motion Lab	Mar 2021
Berkeley Rising Stars EECS	Nov 2020
NYU Game Innovation Lab	Jul 2020

MENTORING EXPERIENCE

Yiding Jiang, Intern, FAIR - *exploration for generalization in RL*	2022
Rob Kirk, Intern, FAIR - *finetuning LLMs with RL and SL*	2022
Theresa Eimer, Intern, FAIR - *training web agents with RL*	2022
Sam Earle, Intern, FAIR - *text-guided world generation in MineCraft*	2022
Yuqing Du, Student Researcher, FAIR / UC Berkeley - *augmenting agents with reasoning*	2022
Sharath Chandra, AI Resident, FAIR - *few-shot learning of new behaviors*	2022
Ishita Mediratta, AI Resident, FAIR - *generalization in sequential decision making*	2022
Minqi Jiang, PhD Student, FAIR - *open-ended learning*	2022
Mikayel Samvelyan, PhD Student, FAIR - *open-ended learning for MARL*	2022
Yingchen Xu, PhD Student, FAIR - *self-supervised reinforcement learning*	2022
Jean-Baptiste Gaya, PhD Student, FAIR - *continual reinforcement learning*	2022
Jesse Mu, Intern, FAIR - *language for exploration*	2021
Aaron Roth, PhD Student, UMD (now US Naval Research Lab) - *representation learning*	2020
Chang Ye, MS Student, NYU (now Google) - *adaptation to new environments*	2020
Srikar Yellapragada, MS Student, NYU (now Stony Brook) - *RL for translation*	2019

Chandra Konkimalla, MS Student, NYU (now Amazon) - *learning from demonstrations* 2019
Zeping Zhan, MS Student, NYU (now Kooick) - *multi-agent learning in social dilemmas* 2019

REVIEWING EXPERIENCE

2022: ICLR, ICML, NeurIPS, EWRL, ICLR GMS Workshop
2021: ICLR, ICML, NeurIPS
2020: ICLR, ICML, NeurIPS, UAI, ICML LAOW Workshop, IEEE
2019: ICLR, ICML, NeurIPS, ICML I3 Workshop
2018: ICLR, ICML, NeurIPS

ORGANIZING EXPERIENCE

Agent Learning in Open-Endedness (ALOE) Workshop at ICLR 2022
Unsupervised Reinforcement Learning (URL) Workshop at ICML 2021

TEACHING EXPERIENCE

African Master's of Machine Intelligence (AMMI), Kigali, Rwanda – NLP March 2019
Princeton McGraw Center, New Jersey, USA – Math, Physics 2015 - 2016

RELEVANT SKILLS

PyTorch, JAX, Tensorflow, Python, Java, Matlab, R, C++, OCaml