

# Prithviraj Ammanabrolu

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## Education

### PhD Computer Science

2018 - 2021

Georgia Institute of Technology

Advisor: Professor Mark O. Riedl

Thesis: Language Learning in Interactive Environments

**Research Areas: Natural Language Processing, Reinforcement Learning, Interactive Narrative, Knowledge Graphs, and Computational Creativity**

### B.S. Computer Science

2015 - 2018

Georgia Institute of Technology

Threads: Intelligence and Theory, Overall GPA 3.9, Dean's List 2015-2018

## Publications

### Under Review

#### [How to Motivate Your Dragon: Teaching Goal-Driven Agents to Speak and Act in Fantasy Worlds](#)

**P Ammanabrolu**, J Urbanek, M Li, A Szlam, T Rocktäschel, J Weston

*Preprint. Under Review.*

[Project Page](#)

#### [Automated Storytelling via Causal, Commonsense Plot Ordering](#)

**P Ammanabrolu**, W Cheung, W Broniec, and MO Riedl

*Preprint. Under Review.*

[Code](#)

#### [How to Avoid Being Eaten by a Grue: Structured Exploration Strategies for Textual Worlds](#)

**P Ammanabrolu**, E Tien, M Hausknecht, and MO Riedl

*Preprint. Under Review.*

[Code](#), [VentureBeat Article](#), [Recorded Talk](#)

### Archival Conferences/Workshops

#### [Bringing Stories Alive: Generating Interactive Fiction Worlds](#)

**P Ammanabrolu\***, W Cheung\*, D Tu, W Broniec, and MO Riedl

*The 16th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-20)*

[Code](#), [Demo](#), [Recorded Talk](#)

#### [Toward Automated Quest Generation in Text-Adventure Games](#)

**P Ammanabrolu**, W Broniec, A Mueller, J Paul, and MO Riedl

*International Conference on Computational Creativity (ICCC-20)*

## Graph Constrained Reinforcement Learning for Natural Language Action Spaces

**P Ammanabrolu**, M Hausknecht

*International Conference on Learning Representations (ICLR-20), Addis Ababa, Ethiopia.*

[Code](#), [Video Presentation](#), [Conference Site](#)

## Story Realization: Expanding Plot Events into Sentences

**P Ammanabrolu**, E Tien, W Cheung, Z Luo, W Ma, LJ Martin, and MO Riedl

*Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI-20), New York City, NY.*

[Code](#), [Slides](#)

## Interactive Fiction Games: A Colossal Adventure

M Hausknecht, **P Ammanabrolu**, MA Cote, and X Yuan

*Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI-20), New York City, NY.*

[Code](#), [Blog](#)

## Transfer in Deep Reinforcement Learning using Knowledge Graphs

**P Ammanabrolu** and MO Riedl

*Text Graphs @ Empirical Methods in Natural Language Processing (EMNLP) 2019. Hong Kong.*

[Code](#)

## Guided Neural Language Generation for Automated Storytelling

**P Ammanabrolu**, E Tien, W Cheung, Z Luo, W Ma, LJ Martin, and MO Riedl

*Proceedings of StoryTelling at the Association of Computational Linguistics 2019, Florence, Italy.*

[Code](#), [Slides](#)

## Playing Text-Adventure Games with Graph-Based Deep Reinforcement Learning

**P Ammanabrolu** and MO Riedl

*Proceedings of The North American Chapter of the Association for Computational Linguistics 2019, Minneapolis, MN.*

[Code](#), [Slides](#), [Blog](#)

## Event Representations for Automated Story Generation with Deep Neural Nets

LJ Martin, **P Ammanabrolu**, X Wang, W Hancock, S Singh, B Harrison, and MO Riedl

*Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18), New Orleans, LA.*

[Code](#)

## Non-archival Workshops

### Bringing Stories Alive: Generating Interactive Fiction Worlds

**P Ammanabrolu**\*, W Cheung\*, D Tu, W Broniec, and MO Riedl

*Narrative Understanding, Storylines, and Events (NUSE) @ ACL 2020*

[Code](#), [Demo](#), [Recorded Talk](#)

### How To Avoid Being Eaten By a Grue: Exploration Strategies for Text-Adventure Agents

**P Ammanabrolu**, E Tien, Z Luo, and MO Riedl

*Knowledge-based Reinforcement Learning Workshop @ International Joint Conference on Artificial Intelligence (IJCAI-20).*

### Toward Automated Quest Generation in Text-Adventure Games

**P Ammanabrolu**, W Broniec, A Mueller, J Paul, and MO Riedl

*Computational Creativity in Natural Language Generation @ International Conference on Natural Language Generation 2019. Tokyo, Japan.*

### Interactive Fiction Games: A Colossal Adventure

M Hausknecht, **P Ammanabrolu**, MA Cote, and X Yuan

Deep Reinforcement Learning Workshop at Neural Information Processing Systems (NeurIPS) 2019. Vancouver, CA.

### Playing Text-Adventure Games with Graph-Based Deep Reinforcement Learning

**P Ammanabrolu** and MO Riedl

*Neural Information Processing Systems (NeurIPS) 2018 Wordplay: Reinforcement and Language Learning in Text-based Games Workshop, Montreal, QC.*

### Improvisational Storytelling Agents

LJ Martin, **P Ammanabrolu**, X Wang, S Singh, B Harrison, M Dhuliawala, P Tambwekar, A Mehta, R Arora, N Dass, C Purdy, and MO Riedl

*Neural Information Processing Systems (NeurIPS) 2017 Workshop on Machine Learning for Creativity and Design, Long Beach, CA.*

### Event Representations for Automated Story Generation with Deep Neural Nets

LJ Martin, **P Ammanabrolu**, X Wang, W Hancock, S Singh, B Harrison, and MO Riedl

Conference Knowledge Discovery and Datamining (KDD) 2017 Workshop on Machine Learning for Creativity, Halifax, NS.

## Teaching Experience

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### Teaching Assistant

Aug 2017 - Dec 2019

CS-3600: Intro to Artificial Intelligence, Georgia Tech - Atlanta, GA

### Student Research Mentorship

Aug 2018 - Present

- Wesley Cheung, MS Computer Science
- Ethan Tien, MS Computer Science
- Wai Man Si, MS Computer Science
- Ran (Renee) Jia, MS Computer Science
- William Broniec, MS Computer Science
- Alejandro Escontrela, BS Computer Science
- Dan Tu, MS Computer Science
  - Now Software Engineer at Microsoft Azure
- William Ma, MS Computer Science
  - Now Software Development Engineer at Amazon
- Jeffery Luo, BS Computer Science
  - Now Global Investment Research Analyst at Goldman Sachs
- Anush Mattapalli, BS Computer Science
  - Now Software Engineer at NCR Corporation

## Work Experience

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### Research Assistant

Jan 2017 - Present

Entertainment Intelligence Lab, Georgia Tech - Atlanta, GA

- Exploring the use of deep reinforcement learning with natural language state and action spaces
- Using knowledge graphs to inject domain knowledge into language-based tasks
- Finding effective data representations and evaluation metrics for training neural networks in automated story generation and procedural world & quest generation for text-games
- **Mentored 10 Bachelor's and Master's students** on their research theses

## Research Intern

May 2020 - Aug 2020

Facebook AI Research - New York City, NY

- Worked with [Jason Weston](#), [Arthur Szlam](#), [Tim Rocktächel](#) on the [ParlAI](#) team and [LIGHT](#), a large-scale crowdsourced text-game
- Collected and released datasets crowdsourced by **over 14,000 players** of natural language quests in LIGHT and a commonsense knowledge graph ATOMIC-LIGHT
- Developed goal-driven questing agents with reinforcement learning that act and speak in LIGHT

## Research Intern

May 2019 - Aug 2019

Microsoft Research - Redmond, WA

- Worked with [Matthew Hausknecht](#) in the Reinforcement Learning team
- Aided in development of baseline text-game playing agents for [Jericho](#), a text-game playing platform
- Developed SOTA RL algorithm that is able to dynamically generate language in text-games

## Software Engineering Intern

May 2018 - Aug 2018

Oracle Intelligent Bots Service - Redwood City, CA

- Developed a patented algorithm to create knowledge graphs for low resource natural language datasets
- Created a method that improves the natural language understanding capabilities by over 10% (classification rate) of the chatbot platform using the generated graph and graph embedding techniques

## Machine Learning Intern

May 2017 - May 2018

Radix Health - Atlanta, GA

- Used machine learning and predictive analytics techniques to model patients' no-show risks for healthcare clinics
- Used natural language processing to design a chatbot to improve patient access
- Built and deployed machine learning systems for these cases from scratch to production, currently utilized by **over 40 clinics and over a 1,000 doctors** across America

## Skills

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**Technical:** Natural Language Processing, Reinforcement Learning, Machine Learning, Knowledge Graphs, Semantic Web Technologies, Computer Vision, Predictive Analytics, Agile Methodologies, NoSQL

**Programming Languages:** Python, R, Java, C/C++, C#, SQL, SPARQL

**Frameworks and Tools:** pyTorch, scikit-learn, Tensorflow, nltk, AutoML, Couchbase, MongoDB, Spring Boot

**Languages:** English, Telugu, Sanskrit

## Professional Activities

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### Organizer

[Wordplay: When Language Meets Games Workshop](#) at NeurIPS 2020

### Program Committee

- Neural Information Processing Systems (NeurIPS) 2019, 2020
- Meeting of the Association for Computational Linguistics (ACL) main and demo tracks 2020
- North American Chapter of the Meeting of the Association for Computational Linguistics (NAACL) 2019
- AAAI Conference on Artificial Intelligence (AAAI) 2019, 2020
- International Conference on Machine Learning (ICML) 2020
- International Conference on Learning Representations (ICLR) 2020
- Empirical Methods in Natural Language Processing (EMNLP) 2020
- ACM CSUR Computing Surveys
- TextGraphs Workshop at EMNLP 2020

- Language and Reinforcement Learning Workshop (LaReL) at ICML2020
- Workshop on Learning in Artificial Open Worlds (LAOW) at ICML 2020

## Institutional Service

Georgia Institute of Technology

- Reviewer for President's Undergraduate Research Awards (PURA) 2019
- School of Computer Science's Prospective Student Visit Week, Coordinator 2019
- School of Interactive Computing's Prospective Student Visit Week, Volunteer 2019, 2020

## Hackathons and Video Game Development

2015 - 2017

- HackIllinois: Health Desk - Desktop app that checks posture using computer vision
- SwampHacks: Labyrinth - 3D survival maze game built with Unity engine and C#; top 10 overall
- HackGT: CorCal - App to sync multiple calendars; built with Java and the Swing library
- Video Game Development Club (VG Dev) at Georgia Tech: HowRogue a Roguelike built in C++

## Media Coverage

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[Researchers combine reinforcement learning and NLP to escape a Grue monster](#)

Venture Beat. Khari Johnson, June 30, 2020

[Georgia Tech Artificial Intelligence Research Includes Collaborative Approaches with Humans, Automating Content, and More](#)

Georgia Tech GVU Center. Joshua Preston, Feb 2, 2018.

[Sztuczna inteligencja jako pisarz: Generowanie fabuły](#)

(Translation from Polish: Artificial Intelligence as a Writer: Story Generation)

Zeszyty Maryny. Patrycja Świeczkowska, Oct 4, 2019.

[Changing the Conversation: Georgia Tech Researchers Provide New Approach to Automated Story Generation](#)

Georgia Tech School of Interactive Computing. David Mitchell, Feb 4, 2020.