

## M Charity

AI and Game Design PhD Candidate

[mlc761@nyu.edu](mailto:mlc761@nyu.edu) - <https://mastermilkx.github.io/>

---

### Education

*New York University - Tandon School of Engineering*

PhD, Game Design and Artificial Intelligence, GPA 3.63/4.00

Brooklyn, NY  
expected May 2024

- 2022-2024 GAANN Scholar recipient

*Virginia Commonwealth University*

BS, Computer Science with minor in Mathematics, GPA 3.81/4.00

Richmond, VA  
May 2019

- 2019 College of Engineering Outstanding Student Award
- 2018 Wright Access Scholarship Recipient
- 2017 and 2018 EDU Tech Scholarship Recipient
- 2016 Provost Scholarship Recipient

*Deep Run High School - Center for Information Technology*

High School Diploma, GPA 4.94/4.00

Glen Allen, VA  
June 2016

- 2015 NCWIT National Aspiring Award Winner
- 2014 NCWIT Regional Aspiring Award Winner

### Research Experience

*New York University - Tandon School of Engineering*

PhD Researcher

Brooklyn, NY  
September 2019 - present

- Studying game design and artificial intelligence under Dr. Julian Togelius
- Led multiple teams of undergraduate and masters students in game AI research projects
- Designed, implemented, and deployed crowd-sourced mixed-initiative level designer for the game Baba is You
- Helped develop Sims simulator framework for generating and populating novel houses
- Developed quality-diversity system for creating levels with specific mechanic features
- Helped develop game agents implementing GPT-2 transformer to play the word game Codenames
- Developed the learning framework for and hosted the Keke AI competition
- Developed, launched, and maintained the aesthetic learning Twitter bot
- Developed a novelty search system for generating artificial fingerprints
- Helped develop persona driven game playing agent evaluation system
- Developed an online interactive evolution 3d voxel structure generator system
- Developed an open-ended abstract simulation environment for multi-agent FSMs
- Developed a recommendation and generation system for abstract game features using a fine-tuned GPT-2 model
- Helped develop a micro text-to-game asset generator model

*Virginia Commonwealth University*

Unity Programmer MCV moVR - Virtual Reality Physical Therapy Lab

Richmond, VA  
Jan 2019 - Aug 2019

- Built 5-game virtual reality game suite for fibromyalgia patients (Build-A-Bot)
- Prototyped HTC Vive full-body motion capture system for animation
- Built pain rating system for viewing work-effort of physical activities
- Built card matching VR game for fibromyalgia patients
- Prototyped pain categorization and selection VR system

Natural Language Processing Undergraduate Researcher

Jun 2016 - Jan 2019

- Developed named-entity recognition system for drug occurrences
- Integrated interface for SemMed Database
- Helped develop literature based discovery neural network
- Developed latent semantic analysis system for doctor-patient interaction

*University of Minnesota - Twin Cities*

NSF Big Data REU Researcher

Minneapolis, MN  
Jun 2018 - Aug 2018

- Worked in Dr. Victoria Interrante's virtual reality lab
- Designed and implemented a novel locomotion VR system

- Ran a user-based experiment with 10 participants for the performance of the system

## Leadership/Teamwork Experience

### *PCG Workshop 2024*

#### Co-organizer for PCG Workshop 2024

- Helped organize the 2024 Procedural Content Generation Workshop at FDG 2024
- Co-wrote and submitted the workshop proposal document

Worcester, MA  
Sept 2023 -

### *EXAG 2021*

#### Co-organizer for EXAG 2021

- Helped organize and host the 2021 Experimental AI in Games Workshop at AIIDE 2021
- Maintained and updated the EXAG.org website
- Put together the Call for Papers, arranged presentation schedule, and recruited reviewers

Virtual  
Mar 2021 - Oct 2021

### *Virginia Commonwealth University*

#### Computer Science Student Advisory Board member

- Communicated with both students and professors about state of the department
- Volunteer as ambassador at College of Engineering open houses
- Promote student-led social clubs and extracurricular activities

Richmond, VA  
May 2018 - May 2019

### *FRC Team 1086 - Blue Cheese*

#### Lead Programmer

- Programmed team's competition robot in C++ for FRC season

Glen Allen, VA  
May 2013 - Jul 2015

#### FTC Captain

- Captain of the FTC division of Blue Cheese - Team 93 Blue Cheese Jr.

Jul 2015 - Feb 2016

### *Deep Run High School*

#### Leader of Computer Club Game Design Division

- Founder and leader of the game design division
- Organized and managed game development within sub-teams

Glen Allen, VA  
Oct 2012 - May 2015

#### CyberPatriot

- JV Captain (freshman and sophomore year)
- Veteran member of all-girls team (junior year)

Oct 2012 - May 2015

## Technical Work Experience

### *New York University*

#### Adjunct Professor - CS-GY 6553 / CS-UY 4553

- Co-taught the undergraduate / graduate level spring semester Game Design class
- Created and taught lectures and ran administrative tasks such as entering grades
- Answered student questions and aided with game engine technical difficulties
- Critiqued and reviewed prototype games during class presentations
- Taught Spring semester 2023 and 2024

Brooklyn, NY  
Jan - May 2023, 2024

#### Teaching Assistant

- Teaching assistant for multiple CS graduate and undergraduate classes
- Artificial Intelligence (CS-GY 6613) - Fall semester 2020 and 2021
- AI for Games (CS-GY 6943) - Spring semester 2021
- Game Design (CS-UY 4553, CS-GY - 6553) - Spring semester 2022 and Fall semester 2023
- Graded projects, wrote homework assignments, and tutored during office hours

Brooklyn, NY  
Aug 2020 - Dec 2023

### *modl.ai*

#### Research Consultant Contractor

- Researched and developed the flexible replay prototype system for the startup modl.ai
- Used the Unity Game engine to develop a regression testing game environment
- Designed and developed a local search-based agent to replay and adapt to user playtraces of levels

Copenhagen, Denmark (Remote)  
July 2023 - Sept 2023

### *FDGTV*

## Junior Interviewer

- Interviewed multiple academic authors and presenters at the FDG 2023 conference
- Interviews were posted on the FDGTV YouTube channel

Lisbon, Portugal  
Apr 2023

## LAIKA Team

### Research Consultant Contractor

- Researched and developed the Character Creator tool for the startup company LAIKA
- Researched up-and-coming NLP technologies to implement in the LAIKA product

Copenhagen, Denmark (Remote)  
May 2022 - Aug 2022

## Virginia Commonwealth University

### Teaching Assistant - CMSC 257

- Teaching assistant grading projects, aiding with lab assignments, and tutoring during office hours

Richmond, VA  
Aug 2018 - May 2019

## CodeVA

### Teaching Assistant - Game Design Summer Camp

- Assisted with teaching Scratch and game development to elementary school children

Richmond, VA  
Aug 2015 - Sep 2015

## University of Richmond

### Web Services Intern

- Intern to the back-end web services team monitoring statistics for web traffic

Richmond, VA  
Jun 2015 - Aug 2015

## Invited Talks, Conferences, and Workshops

### Game Devs of Color 2022

- Invited speaker for the Game Devs of Color conference (virtual)
- Talk Title: Developing Cooler PCG Systems based on Real-Time Player Input

Online  
Sept 2022

### PWLConf 2022

- Invited speaker for the Papers We Love conference in St Louis, Missouri
- Talk Title: 3CG: Collaborative and Creative Content Generation in Game Design

St. Louis, MO  
Sept 2022

### Games for Change 2023

- Invited speaker for the Games for Change conference in New York City, New York
- Talk Title: Using AI in Game Design

New York City, NY  
July 2023

### ALOE Workshop 2023

- Invited speaker for the Agent Learning in Open-Ended Environments Workshop
- Workshop during the NeurIPS 2023 conference in New Orleans, Louisiana

New Orleans, LO  
Dec 2023

### Schloss Dagstuhl Seminar 2024

- *Invited to attend Schloss Dagstuhl Seminar 2024*
- *Seminar Topic: Computational Creativity for Game Development*

Wadern, Germany  
Jun 2024

## Technical Skills

### Programming Languages

- Javascript, Python (Keras, Tensorflow, numpy, matplotlib, regex), PHP, MySQL, C#, C++, C, Java, Perl

### Software, game engines, and operating systems

- HTML5, AWS, PICO-8, Unity, Bitsy, Google Sheets, git, jupyter-notebook, unix, MACOS, Windows

## Publications

- **Charity, M.,** Green, M. C., Khalifa, A., & Togelius, J. (2020, September). Mech-elites: Illuminating the mechanic space of gvg-ai. In International Conference on the Foundations of Digital Games (pp. 1-10).
- **Charity, M.,** Khalifa, A., & Togelius, J. (2020). Baba is Y'all: Collaborative Mixed-Initiative Level Design. 2020 IEEE Conference on Games (CoG), 542-549.

- **Charity, M.**, D. Rajesh, R. Ombok, and L. B. Soros. "Say 'Sul Sul!' to SimSim, A Sims-Inspired Platform for Sandbox Game AI". *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 16, no. 1, Oct. 2020, pp. 182-8, <https://ojs.aaai.org/index.php/AIIDE/article/view/7428>.
- Jaramillo, C., **M. Charity**, R. Canaan, and J. Togelius. "Word Autobots: Using Transformers for Word Association in the Game Codenames". *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 16, no. 1, Oct. 2020, pp. 231-7, <https://ojs.aaai.org/index.php/AIIDE/article/view/7435>.
- Green, M. C., Khalifa, A., **Charity, M.**, Bhaumik, D., & Togelius, J. (2022, July). Predicting Personas Using Mechanic Frequencies and Game State Traces. In 2022 IEEE Congress on Evolutionary Computation (CEC) (pp. 1-8). IEEE.
- **Charity, M.**, Memon, N., Jiang, Z., Sen, A., & Togelius, J. (2022, September). Diversity and Novelty MasterPrints: Generating Multiple DeepMasterPrints for Increased User Coverage. In 2022 International Conference of the Biometrics Special Interest Group (BIOSIG) (pp. 1-4). IEEE.
- **Charity, M.**, & Togelius, J. (2022, August). Keke AI Competition: Solving puzzle levels in a dynamically changing mechanic space. In 2022 IEEE Conference on Games (CoG) (pp. 570-575). IEEE.
- **Charity, M.**, & Togelius, J. (2022, October). Aesthetic Bot: Interactively Evolving Game Maps on Twitter. In *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment* (Vol. 18, No. 1, pp. 18-25).
- Green, M. C., Khalifa, A., **Charity, M.**, & Togelius, J. (2022, September). Persona-driven Dominant/Submissive Map (PDSM) Generation for Tutorials. In *Proceedings of the 17th International Conference on the Foundations of Digital Games* (pp. 1-10).
- **Charity, M.**, Dave, I., Khalifa, A., & Togelius, J. (2022). Baba is Y'all 2.0: Design and Investigation of a Collaborative Mixed-Initiative System. *IEEE Transactions on Games*.
- Merino, T., **Charity, M.**, & Togelius, J. (2023, April). Interactive Latent Variable Evolution for the Generation of Minecraft Structures. *International Conference on the Foundations of Digital Games Workshop on Procedural Content Generation*.
- **Charity, M.**, Bhartiya, Y., Zhang, D., Khalifa, A., & Togelius, J. (2023, August). A Preliminary Study on a Conceptual Game Feature Generation and Recommendation System. *arXiv preprint arXiv:2308.13538*.
- **Charity, M.**, Rajesh, D., Earle, S., & Togelius, J. (2023, July). Amorphous Fortress: Observing Emergent Behavior in Multi-Agent FSMs. *arXiv preprint arXiv:2306.13169*. *Artificial Life Conference - ALIFE for and from Games Workshop*, 2023.
- Merino, T., Negri, R., Rajesh, D., **Charity, M.**, & Togelius, J. (2023, October). The Five-Dollar Model: Generating Game Maps and Sprites from Sentence Embeddings. In *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment* (Vol. 19, No. 1, pp. 107-115).